Draft Environmental Assessment of Proposed Amendment to 4(d) Protective Regulations for Threatened Salmonid ESUs

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ABSTRACT

The National Marine Fisheries Service (NMFS) has reviewed the status of 26 Evolutionarily Significant Units (ESUs) of salmon (chum, *Oncorhynchus keta*; coho, *O. kisutch*, *O. nerka*; chinook, *O. tshawytscha*) and *O. mykiss* (which include anadromous steelhead and resident rainbow trout occurring in the same areas) previously listed as threatened and endangered under the Endangered Species Act (ESA), as well one candidate ESU. NMFS is proposing that 23 of the reviewed ESUs be listed as threatened species under the ESA.

Section 9 of the ESA prohibits the "take" of species listed as endangered, and section 4(d) requires NMFS to adopt protective regulations that the agency deems necessary and advisable for the conservation of species listed as "threatened." For threatened species, NMFS may prohibit any act that is prohibited under section 9 for endangered species. NMFS has determined for threatened salmonids that the section 9 take prohibitions can be applied with certain exceptions, or "limits," and has adopted 4(d) rules that prohibit take except for specific programs or activities that minimize the risk of take or otherwise contribute to the species' conservation. Although listing determinations and the promulgation of protective regulations are non-discretionary actions not subject to the National Environmental Policy Act (NEPA), NMFS does have discretion in determining those specific protective regulations and limits that are necessary and advisable for the conservation of threatened ESUs. Accordingly, the promulgation of 4(d) protective regulations is subject to the requirements of NEPA.

In conjunction with the proposed listing determinations, NMFS proposes to revise and simplify existing 4(d) protective regulations for threatened salmon and *O. mykiss* ESUs. NMFS proposes to revise the protective regulations so that all threatened ESUs are subject to the same limits. Additionally, NMFS proposes to revise the current protective regulations so that the section 9 take prohibitions do not apply to adipose-fin-clipped hatchery fish and resident *O. mykiss* (rainbow trout). NMFS has determined that this latter amendment will minimize the regulatory burden of managing threatened listings, while retaining the necessary and advisable protections to provide for the conservation of threatened salmon and *O. mykiss* ESUs.

This Environmental Assessment (EA) describes two alternative approaches, including a proposed action that NMFS could take in promulgating protective regulations for salmonids listed as threatened under the ESA. This EA assesses the environmental impacts of the alternative actions relative to baseline conditions established by existing laws and regulations in the context of the proposed threatened listings. The results of this analysis indicate that no significant impacts on the human environment are expected to result from implementation of the proposed action.

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ACRONYMS AND ABBREVIATIONS

CDFG	California Department of Fish and Game
COE	United States Army Corps of Engineers
CVP	Central Valley Project
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FFR	Forest and Fish Report
FMEP	Fishery Management and Evaluation Plan
FR	Federal Register
HGMP	Hatchery and Genetic Management Plan
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NFH	National Fish Hatchery
NMFS	National Marine Fisheries Service
O.	Oncorhynchus
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
USDA	United States Department of Agriculture

1. PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF PURPOSE AND NEED

The purposes of the proposed action are as follows:

- Provide for the conservation of two previously endangered ESUs that are proposed for listing as threatened, and one ESU previously identified as a candidate species that is proposed for listing as threatened, using the flexibility of section 4(d) to prohibit take only to the extent needed for conservation.
- Standardize and simplify the 4(d) protections for all 23 ESUs that are proposed for listing as threatened, in particular, applying the flexibility of section 4(d) to all threatened ESUs to prohibit take only to the extent needed for conservation.
- Provide protection of hatchery fish and resident rainbow trout (*O. mykiss*) that are proposed for listing as threatened only to the extent required for the conservation of the listed ESUs.

The need for the proposed action is discussed in the following paragraphs.

Without revision to the current 4(d) rule, three ESUs would not be protected by any prohibitions on take (Columbia River Coho, which has not been previously listed, Upper Columbia River *O. mykiss*, and Sacramento River winter-run chinook, which were previously listed as endangered and are now proposed for listing as threatened). NMFS has concluded that state and local regulations, voluntary efforts, and limitations on federal actions under ESA and other federal laws are not adequate to provide for conservation of these ESUs. The previous ESA listings of salmon and *O. mykiss* ESUs have provided the incentive for numerous protective measures and regulations. While many threats to salmon and *O. mykiss* are being rectified (e.g., over-harvest, fish passage above artificial barriers), other threats have been reduced but not eliminated. In developing the proposed listing determinations for the subject ESUs, NMFS evaluated existing protections for West Coast salmonids to determine if the cumulative effect of these protections provides for the conservation of these ESUs (69 FR 33102; June 14, 2004). NMFS has determined that existing protections do not as yet individually or collectively provide sufficient certainty of implementation and effectiveness to substantially reduce the extinction risk for the ESUs under review. NMFS, therefore, deems it necessary and advisable to adopt regulations prohibiting take of these ESUs, except in certain specified circumstances.

Under the current 4(d) protective regulations for threatened ESUs, there are exceptions to, or limits on, the take prohibitions for some ESUs, but not for others. Even for ESUs with limits on the take prohibitions, the limits are not uniformly applied among ESUs. This difference in treatment is confusing for the public and is not reflective, supportive, or encouraging of the conservation needs of the various ESUs.

NMFS proposes to list hatchery fish and resident *O. mykiss* (rainbow trout) that were not previously listed. Without a revision to the current 4(d) protective regulations, take of all listed hatchery fish and resident *O. mykiss* would be prohibited upon listing, except in certain circumstances. NMFS has determined that it is neither necessary nor advisable to protect all hatchery fish and resident rainbow trout (*O. mykiss*) to the same extent as naturally spawned and anadromous fish to ensure conservation of the listed ESUs.

1.2 BACKGROUND OF REGULATORY AUTHORITIES

Section 4(a) of the Endangered Species Act (ESA)) requires the National Marine Fisheries Service (NMFS) to list species it determines are threatened or endangered species after conducting a review of their status and evaluating efforts being made to protect the species. The ESA defines "species" to include subspecies and any "distinct population segment" of vertebrate fish or wildlife that interbreeds when mature. For Pacific salmon and *O. mykiss*, NMFS has adopted a policy defining distinct population segments as "evolutionarily significant units" (56 FR 58612, November 20, 1991), or ESUs (*O. mykiss* ESUs include both anadromous steelhead and resident rainbow trout occurring in the same area). A population or group of populations qualifies as an ESU if it is reproductively isolated and represents an important component of the evolutionary legacy of the species.

For species listed as endangered, section 9(a) of the ESA prohibits activities that result in take. These prohibitions make it illegal for any person subject to the jurisdiction of the United States to take (take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect, or to attempt any of these activities), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered species.

For species listed as threatened, section 4(d) of the ESA requires the Secretary of Commerce to issue such regulations as are deemed necessary and advisable to provide for the conservation of the species. The 4(d) protective regulations may prohibit, with respect to threatened species, some or all of the acts that section 9(a) of the ESA prohibits with respect to endangered species. Both the section 9(a) prohibitions and section 4(d) regulations apply to all individuals, organizations, and agencies subject to United States jurisdiction. Previously, NMFS has adopted section 4(d) rules that apply all of the same prohibitions to threatened species as apply to

endangered species. However, NMFS has flexibility under section 4(d) to tailor protective regulations based on the contents of available conservation measures.

The ESA allows NMFS to permit an otherwise prohibited take, under certain circumstances. For federal agency actions, section 7 of the ESA requires consultation with NMFS if the activity may affect a listed ESU or its critical habitat (section 7(a)(2)). As a result of the consultation, NMFS may issue an "incidental take statement," which sets forth the level of take allowed. For all other actions contemplated by non-federal actors, section 10 of the ESA gives NMFS authority to issue a "direct take" permit for scientific research or enhancement purposes (section 10(a)(1)(A)) or an "incidental take" permit (section 10(a)(1)(B)), if certain conditions are met. Beginning in 1997, NMFS began to use its authority under section 4(d) to tailor specific protective regulations to limit application of the take prohibitions for a range of activities it had determined were conducted consistent with the conservation of the listed species. NMFS created a mechanism whereby parties could obtain an approval certifying that their proposed activity fell within one of the take limits and, therefore, if their activity did result in an incidental take of listed fish, it was not a prohibited take.

The take limits themselves are not prescriptive regulations. The fact that an activity is not conducted within the specified criteria for a take limit does not necessarily mean that the activity violates the ESA or the proposed protective regulations. Many activities do not affect the threatened ESUs covered by NMFS' 4(d) protective regulations, and, therefore, need not be conducted within a given limit to avoid take violations.

1.3 REGULATORY HISTORY

NMFS has adopted 4(d) protective regulations that extend the section 9(a) take prohibitions to all threatened salmon and steelhead. In certain circumstances, exceptions (or limits) provide that take is not prohibited if it is the result of an activity that otherwise adequately provides for the conservation of the species. These 4(d) regulations were adopted at various times, in response to a number of listing determinations, and they contain different limits to the take prohibitions for different ESUs. Currently, there are 29 limits to the take prohibitions for threatened salmon and steelhead species. Comprehensive descriptions of each 4(d) limit are contained in *A Citizen's Guide to the 4(d) Rule*. This document is available in previously published Federal Register (FR) documents (62 FR 38479, July 18, 1997; 65 FR 42422, July 10, 2000; 65 FR 42485, July 10, 2000; 67 FR 1116, January 9, 2002) and on the Internet at the following address: http://www.nwr.noaa.gov/1salmon/salmesa/final4d.htm).

The first six of the 29 limits to be promulgated (50 Code of Federal Regulations §223.204(b)(1) through (b)(6)) were published as an interim rule for the Southern Oregon/Northern California

Coast Coho ESU in 1997 (62 FR 38479, July 18, 1997). These six limits allow for the take of coho salmon in Oregon and California, under certain circumstances, if the take is part of approved fisheries management plans, part of an approved hatchery program, part of approved fisheries research and monitoring activities, or part of approved habitat restoration activities.

In 2000, NMFS promulgated a total of 14 limits affecting 14 ESUs in California, Oregon, and Washington (65 FR 42422, July 10, 2000; §223.203(b)(1) through (b)(13); 65 FR 42485, July 10, 2000; 50 CFR §223.209) (see Appendix A for a summary of these 14 limits). These limits include (b)(1) activities conducted in accordance with ESA section 10 incidental take authorization; (b)(2) scientific or enhancement activities with pending applications at the time of rulemaking; (b)(3) emergency actions related to injured, stranded, or dead salmonids; (b)(4) fishery management activities; (b)(5) hatchery and genetic management programs; (b)(6) activities in compliance with joint Tribal/state plans developed within *United States* v. *Washington* or *United States.* v. *Oregon*; (b)(7) scientific research activities permitted or conducted by the states; (b)(8) state, local, and private habitat restoration activities; (b)(9) properly screened water diversion devices; (b)(10) routine road maintenance activities; (b)(11) certain park pest management activities in Portland, Oregon; (b)(12) certain municipal, residential, commercial, and industrial development and redevelopment activities; (b)(13) forest management activities on state and private lands within the state of Washington; and activities undertaken consistent with an approved tribal resource management plan. The Southern Oregon/Northern California Coasts Coho ESU was included under 3 of these 14 limits (limits §223.203(b)(1), (b)(3), and §223.209 above). The limits published in 2000 that addressed fishery and harvest management, scientific research, and habitat restoration activities did not supersede the previous six limits of the 1997 interim rule, despite addressing the same types of activities. Also in 2000, NMFS issued a rule describing a mechanism for exempting activities undertaken consistent with an approved Tribal Resource Management Plan (65 FR 42485, July 10, 2000; §223.209); this rule applies to all Pacific salmon and steelhead ESUs currently listed as threatened.

In 2002, NMFS added nine additional limits (67 FR 1116, January 9, 2002; §223.203(b)(14) through (b)(22)) addressing four salmonid ESUs in California: the Central Valley Spring-run Chinook, California Coastal chinook, Central California Coast Coho, and Northern California *O. mykiss* ESUs. These limits are essentially identical to limits previously promulgated in 2000 (see Appendix A). These additional nine limits similarly address emergency actions, fishery management activities, artificial propagation programs, scientific research, habitat restoration activities, properly screened water diversions, routine road maintenance activities, and development and redevelopment activities. Rather than including the four California ESUs under the limits promulgated in 2000, NMFS treated these ESUs under separate limits to ensure

that they received timely and appropriate protections under the ESA. See Table C-1 in Appendix C for a summary of applicable 4(d) rules and limits for the subject ESUs.

1.4 DESCRIPTION OF PROPOSED ACTION

NMFS has completed a comprehensive status review of, and is proposing listing determinations for, 26 previously listed salmon and steelhead ESUs, as well one candidate ESU. NMFS has proposed that 23 of the ESUs reviewed be listed as threatened species, presenting implications for the 4(d) protective regulations presently in place.

The current status review and proposed listing determinations are in response to the September 2001 District Court ruling in *Alsea Valley Alliance v. Evans* (161 F. Supp. 2d 1154, D. Oreg. 2001; Alsea ruling). The *Alsea* ruling set aside NMFS' 1998 ESA listing of Oregon Coast coho salmon (63 FR 42587; August 10, 1998). The Court ruled that the ESA does not allow NMFS to list a subset of an ESU, and that NMFS had improperly excluded from the listing hatchery fish it found were part of the ESU. Although the Court's ruling affected only one ESU, the interpretive issue raised by the ruling called into question nearly all of NMFS' Pacific salmonid listing determinations. Following the District Court's ruling, NMFS received several petitions addressing 17 listed salmonid ESUs, including five steelhead ESUs. These petitions cited the *Alsea* ruling and focused on NMFS' past practice of not listing all ESU hatchery fish. Various litigants have also challenged the failure to list resident populations included in threatened and endangered steelhead ESUs. In *Environmental Defense Center et al. v. Evans et al*. (SACV-00-1212-AHS (EEA)), the plaintiffs argue that NMFS failed to include resident populations in the endangered listing of the Southern California steelhead ESU (62 FR 43937; August 18, 1997). In *Modesto Irrigation District et al. v. Evans et al*. (CIV-F-02-6553 OWW DLB (E.D.Cal)), the plaintiffs seek to invalidate NMFS' 1998 threatened listing of the Central Valley California steelhead ESU (63 FR 13347; March 19, 1998) for failing to list hatchery and resident populations identified as part of the ESU. To be compliant with the *Alsea* ruling, all populations or stocks (natural, hatchery, resident, etc.) included in an ESU must be listed if it is determined that the ESU is threatened or endangered under the ESA. As a result, the proposed listing determinations include previously unlisted hatchery and resident fish.

As part of the proposed listing determinations, NMFS proposes amendments to the 4(d) rule to improve the clarity of the protective regulations and to minimize the regulatory burden of managing ESA listings while retaining the necessary and advisable protections to provide for the conservation of threatened salmon and *O. mykiss* ESUs. NMFS proposes aligning the 4(d) regulations by making the following clarifying changes: (1) for those ESUs currently listed as endangered but being proposed for threatened status (the Sacramento River winter-run chinook and Upper Columbia River *O. mykiss* ESUs), NMFS proposes to apply the 4(d) protections and

14 limits promulgated in 2000; (2) for the ESU newly proposed for listing as threatened (Lower Columbia Coho), NMFS proposes to apply the 4(d) protections and 14 limits promulgated in 2000; (3) NMFS proposes to apply the same set of limits to all threatened ESUs by bringing the Snake River fall-run chinook, Snake River spring/summer-run chinook, Southern Oregon/Northern California Coast Coho, Central Valley Spring-run chinook, California Coastal chinook, Central California Coast Coho, and Northern California *O. mykiss* ESUs under the 14 limits promulgated in 2000; (4) NMFS proposes to amend an expired limit (§223.203(b)(2)) providing a temporary exemption for scientific research and enhancement activities with pending applications; (5) NMFS proposes to move the description of the limit for Tribal Resource Management Plans (from §223.209 §223.204) so that the text would appear next to the 13 limits in the CFR (§223.203), improving the clarity of the 4(d) regulations. Additionally, NMFS proposes to revise the current 4(d) protective regulations so that take is not prohibited for adipose-fin-clipped hatchery fish and resident *O. mykiss* (rainbow trout).

NMFS is proposing to take two separate actions: (1) to update the ESU definition and ESA listing status of 27 ESUs; and (2) to amend the 4(d) protective regulations for the 23 ESUs proposed for threatened status. The listing action is non-discretionary and is not subject to the requirements of the National Environmental Policy Act (NEPA). The effects of the changes in listing status are therefore not discussed in this EA. In contrast, while the ESA section 4(d) requirement to adopt protective regulations is also mandatory, the Secretary does have discretion in the specific regulations he deems necessary and advisable to provide for the conservation of threatened species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a) (16 U.S.C. 1533(d)). Accordingly, the promulgation of 4(d) protective regulations is subject to the requirements of NEPA. The baseline for the analysis in this EA is the regulatory landscape that would exist once the (non-discretionary) proposed listing determinations are finalized.

The no action alternative (i.e., no changes being made to the existing 4(d) protective regulations) would: (1) maintain existing coverage of 4(d) protective regulations for those ESUs previously listed as threatened; (2) result in a lack of protective regulations for two ESUs previously listed as endangered but being proposed for threatened status, and one ESU newly proposed as threatened; and (3) apply protective regulations to newly listed hatchery fish and resident *O. mykiss* in ESUs currently subject to a 4(d) rule. In contrast, the effect of the proposed action alternative (i.e., discretionary amendments being made to the 4(d) protective regulations) would be to: (1) maintain existing coverage of 4(d) protective regulations for those ESUs previously listed as threatened; (2) apply 4(d) protective regulations to two ESUs previously listed as endangered, and one ESU newly proposed for threatened status; and (3) not apply 4(d) protective

regulations for newly listed hatchery fish and resident *O. mykiss*. Tables 1-1 and 1-2 illustrate the changes that would result from the two alternatives relative to the baseline that would exist after the non-discretionary listing action occurs.

Table 1-1. Overview of the two alternative actions for 4(d) protective regulations. The protections for hatchery and resident fish within Evolutionarily Significant Units (ESUs) of West Coast salmon (*Oncorhynchus* spp.) and *O. mykiss* are described for each of the two alternatives relative to the baseline of the proposed threatened listings and existing 4(d) protective regulations.

Description of ESU Component(s)	Current ESA Status	**Baseline**		**No Action Alternative**	**Proposed Action Alternative**
		Baseline includes the proposed threatened listings and existing 4(d) protective regulations		*Proposed (non-discretionary) listings in place; No amendments to current 4(d) rules*	*Proposed (non-discretionary) listings in place; Amended 4(d) protective regulations*
		Current Take Prohibitions and Protective Regulations*	Proposed ESA Status *(non-discretionary listing action)*	Applicable 4(d) Protective Regulations	Applicable 4(d) Protective Regulations
All ESUs proposed for threatened status	• 2 endangered ESUs, 19 threatened ESUs, and 2 unlisted ESUs	• Various take prohibitions and 4(d) limits	• All ESUs Threatened	• ESUs subject to a variety of 4(d) limits; some unprotected	• All ESUs subject to the same 4(d) rule
Natural- and hatchery-origin fish in currently listed ESUs	• All naturally spawned fish listed • Only a few hatchery stocks in ESUs included in listings	• Take prohibited of all naturally spawned fish in listed ESUs • Take not prohibited for almost all hatchery fish in listed ESUs. Take prohibited for those hatchery stocks included in listings only.	• All naturally spawned fish listed • All hatchery stocks in ESUs included in listings (~ 162 hatchery programs)	• Take prohibited of all naturally spawned fish in ESUs proposed for listing • Take prohibited of all hatchery fish in ESUs proposed for listing (~ 162 hatchery programs)	• Take prohibited of all naturally spawned fish in ESUs proposed for listing • Take not prohibited of hatchery fish in ESUs proposed for listing, unless adipose fin is intact.

Anadromous and resident fish in *O. mykiss* ESUs **	• All anadromous *O. mykiss* listed • No resident *O. mykiss* listed	• Take prohibited of all anadromous *O. mykiss* • Take not prohibited of resident *O. mykiss* in listed ESUs	• All anadromous *O. mykiss* listed • All co-occurring resident *O. mykiss* listed	• Take prohibited of all anadromous *O. mykiss* • Take prohibited of all resident *O. mykiss* in listed ESUs	• Take prohibited of all anadromous *O. mykiss* • Take not prohibited of resident *O. mykiss* in listed ESUs

* For species listed as endangered, take is prohibited under section 9(a) of the Endangered Species Act (ESA). Take of species listed as threatened is protected by regulations promulgated under section 4(d) of the ESA. 4(d) protective regulations do not apply to endangered species.

** *O. mykiss* is the scientific name for anadromous steelhead and resident rainbow trout. Populations of steelhead and co-occurring rainbow trout are included in the same *O. mykiss* ESU.

Table 1-2. Summary of the two alternatives actions for 4(d) protective regulations, relative to the established baseline, for each of the 23 Evolutionarily Significant Units of West Coast salmon (*Oncorhynchus* spp.) and *O. mykiss*. The first three ESUs listed in the table below are those for which the relative difference in impact between the two alternative actions is most pronounced.

		Baseline		**No Action Alternative**	**Proposed Action Alternative**
Evolutionarily Significant Unit (ESU)	Current ESA Status	*Baseline includes the proposed threatened listings and existing 4(d) protective regulations*		*Proposed (non-discretionary) listings in place; No amendments to current 4(d) rules*	*Proposed (non-discretionary) listings in place; Amended 4(d) protective regulations*
		Proposed ESA Status *(non-discretionary listing action)*	Current Take Prohibitions and Protective Regulations*	Applicable 4(d) Protective Regulations	Applicable 4(d) Protective Regulations
Sacramento River winter-run chinook ESU	*Endangered*	Threatened	Sec. 9(a)	None	Amended 4(d) rule with limits
Upper Columbia River O mykiss ESU	*Endangered*	Threatened	Sec. 9(a)	None	Amended 4(d) rule with limits
Lower Columbia River coho ESU	*Candidate*	Threatened	None	None	Amended 4(d) rule with limits
Ozette Lake sockeye ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits
Central Valley spring-run chinook ESU	*Threatened*	Threatened	2002 4(d) rule with limits	2002 4(d) rule with limits	Amended 4(d) rule with limits
California Coastal chinook ESU	*Threatened*	Threatened	2002 4(d) rule with limits	2002 4(d) rule with limits	Amended 4(d) rule with limits
Upper Willamette River chinook ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits

Lower Columbia River chinook ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits
Puget Sound chinook ESU	*Threatened*	Threatened	2000 4(d) rule; with limits	2000 4(d) rule; with limits	Amended 4(d) rule with limits
Snake River fall-run chinook ESU	*Threatened*	Threatened	1992 4(d) rule	1992 4(d) rule	Amended 4(d) rule with limits
Snake River spring/summer-run chinook ESU	*Threatened*	Threatened	1992 4(d) rule	1992 4(d) rule	Amended 4(d) rule with limits
Southern Oregon/Northern California Coast coho ESU	*Threatened*	Threatened	1997 interim 4(d) rule with limits	1997 interim 4(d) rule with limits	Amended 4(d) rule with limits
Oregon Coast coho ESU	*Remanded to NMFS* [+]	Threatened	2000 4(d) rule with limits [+]	2000 4(d) rule with limits	Amended 4(d) rule with limits
Columbia River chum ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits
Hood Canal summer-run chum ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits
South-Central California Coast O mykiss ESU	*Threatened*	Threatened	2002 4(d) rule with limits	2002 4(d) rule with limits	Amended 4(d) rule.with limits
Central California Coast O mykiss ESU	*Threatened*	Threatened	2002 4(d) rule with limits	2002 4(d) rule with limits	Amended 4(d) rule with limits
California Central Valley O mykiss ESU	*Threatened*	Threatened	2002 4(d) rule with limits	2002 4(d) rule with limits	Amended 4(d) rule with limits
Northern California O mykiss ESU	*Threatened*	Threatened	2002 4(d) rule with limits	2002 4(d) rule with limits	Amended 4(d) rule with limits
Upper Willamette River O mykiss ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits
Lower Columbia River O mykiss ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits
Middle Columbia River O mykiss ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits

Snake River Basin O mykiss ESU	*Threatened*	Threatened	2000 4(d) rule with limits	2000 4(d) rule with limits	Amended 4(d) rule with limits

1992 4(d) rule: 57 FR 14653; April 22, 1992
1997 interim 4(d) rule: 62 FR 38479, July 18, 1997
2000 4(d) rule: 65 FR 42422, July 10, 2000; 65 FR 42485, July 10, 2000
2002 4(d) rule: 67 FR 1116, January 9, 2002

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+ The Court in *Alsea Valley Alliance v. Evans* remanded to NMFS the 1998 threatened listing determination for the Oregon Coast coho ESU. Presently, ESA protections for the Oregon Coast coho ESU are not enforceable, although technically they remain in place.

*For species listed as endangered, take is prohibited under section 9(a) of the Endangered Species Act (ESA). Take of species listed as threatened is protected by regulations promulgated under section 4(d) of the ESA. 4(d) protective regulations do not apply to endangered species.

1.5 ACTION AREA—WASHINGTON, IDAHO, OREGON, CALIFORNIA

The 23 ESUs NMFS is reviewing in this EA are in the states of Washington, Idaho, Oregon, and California. Figures 1-1 through 1-4 show area maps, by species, for each of the subject ESUs.

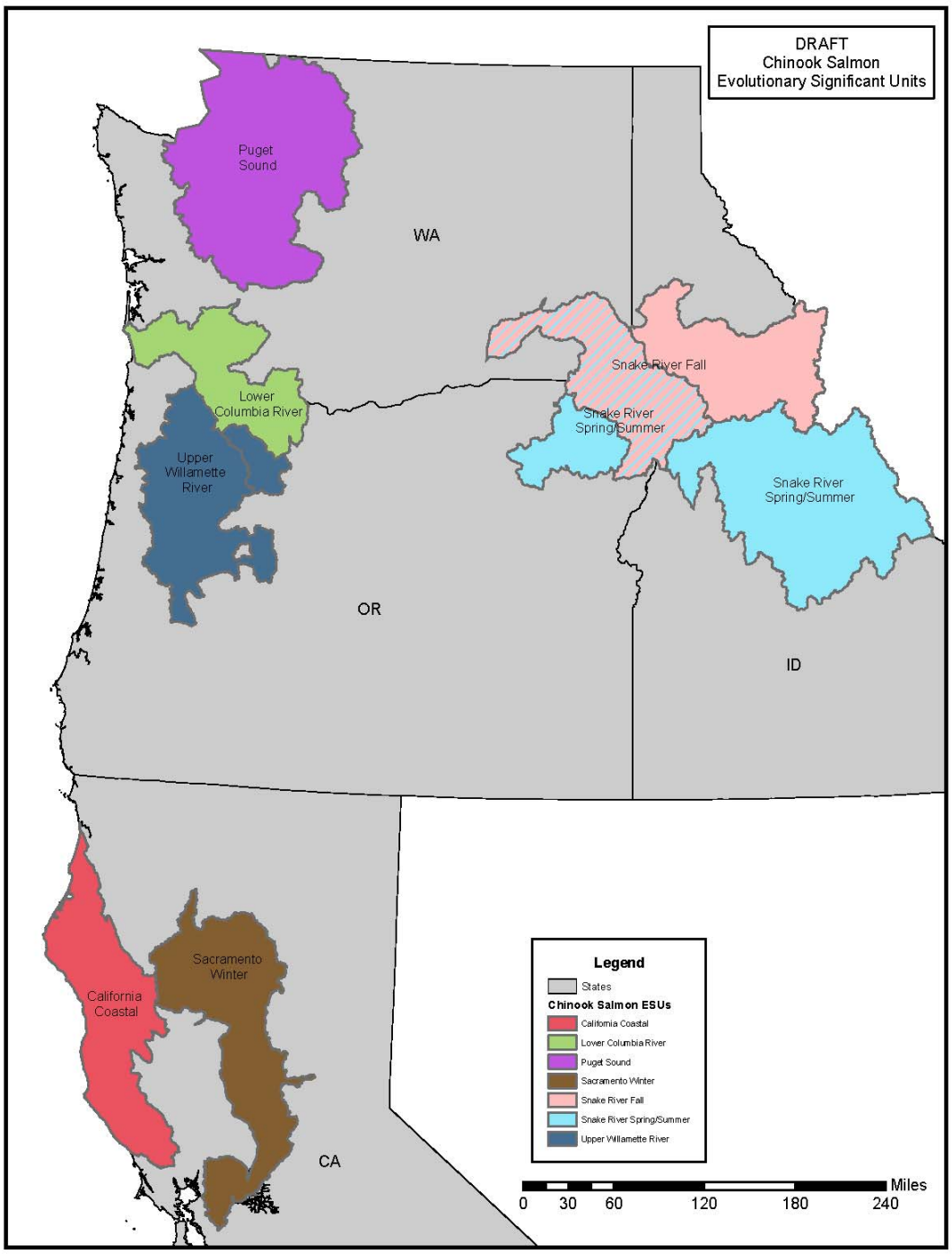

Figure 1-1. Evolutionarily Significant Units (ESUs) of chinook salmon (*Oncorhynchus tshawytscha*) proposed for "threatened" status under the Endangered Species Act.

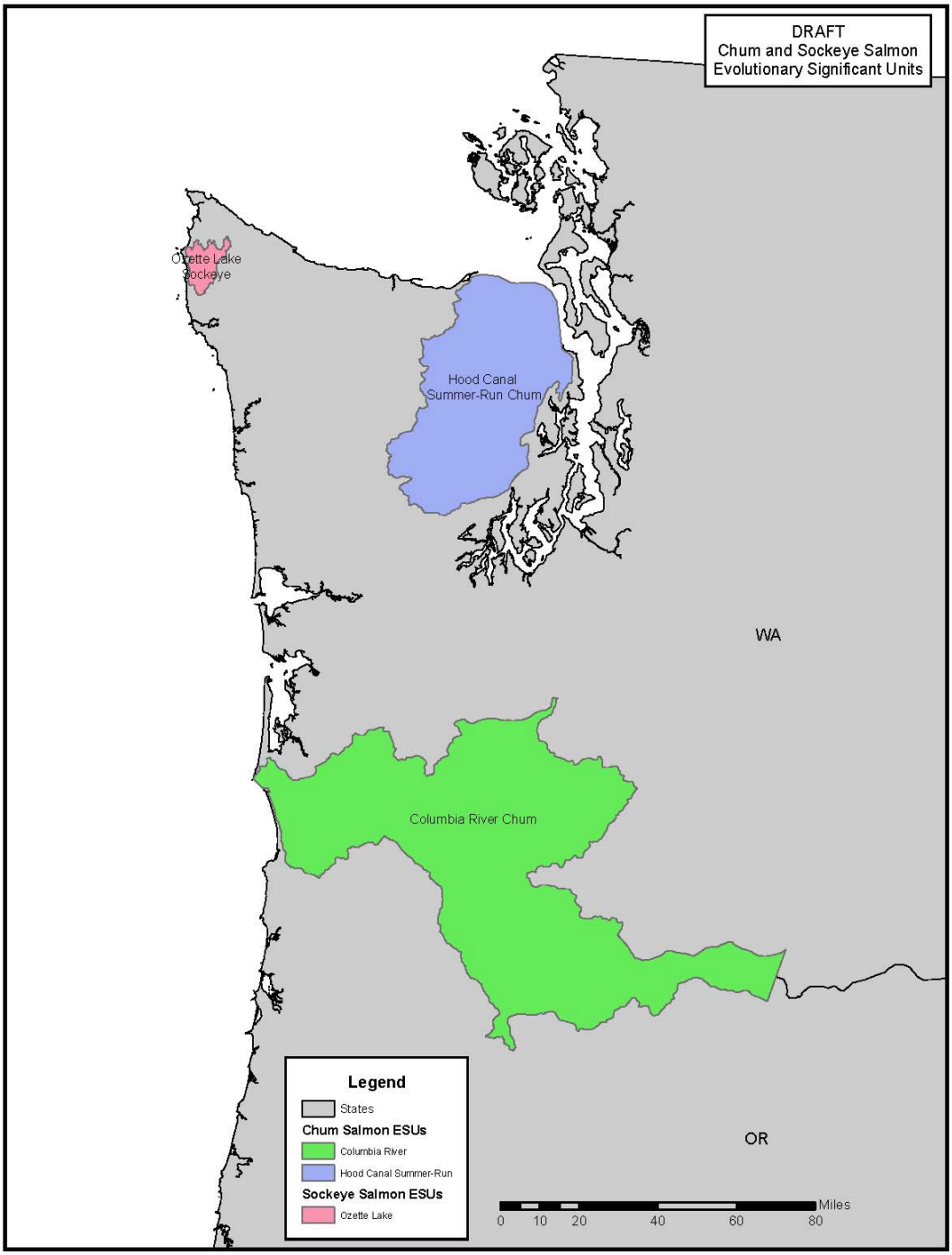

Figure 1-2. Evolutionarily Significant Units (ESUs) of chum (Oncorhynchus keta) and sockeye (*Oncorhynchus nerka*) salmon proposed for "threatened" status under the Endangered Species Act.

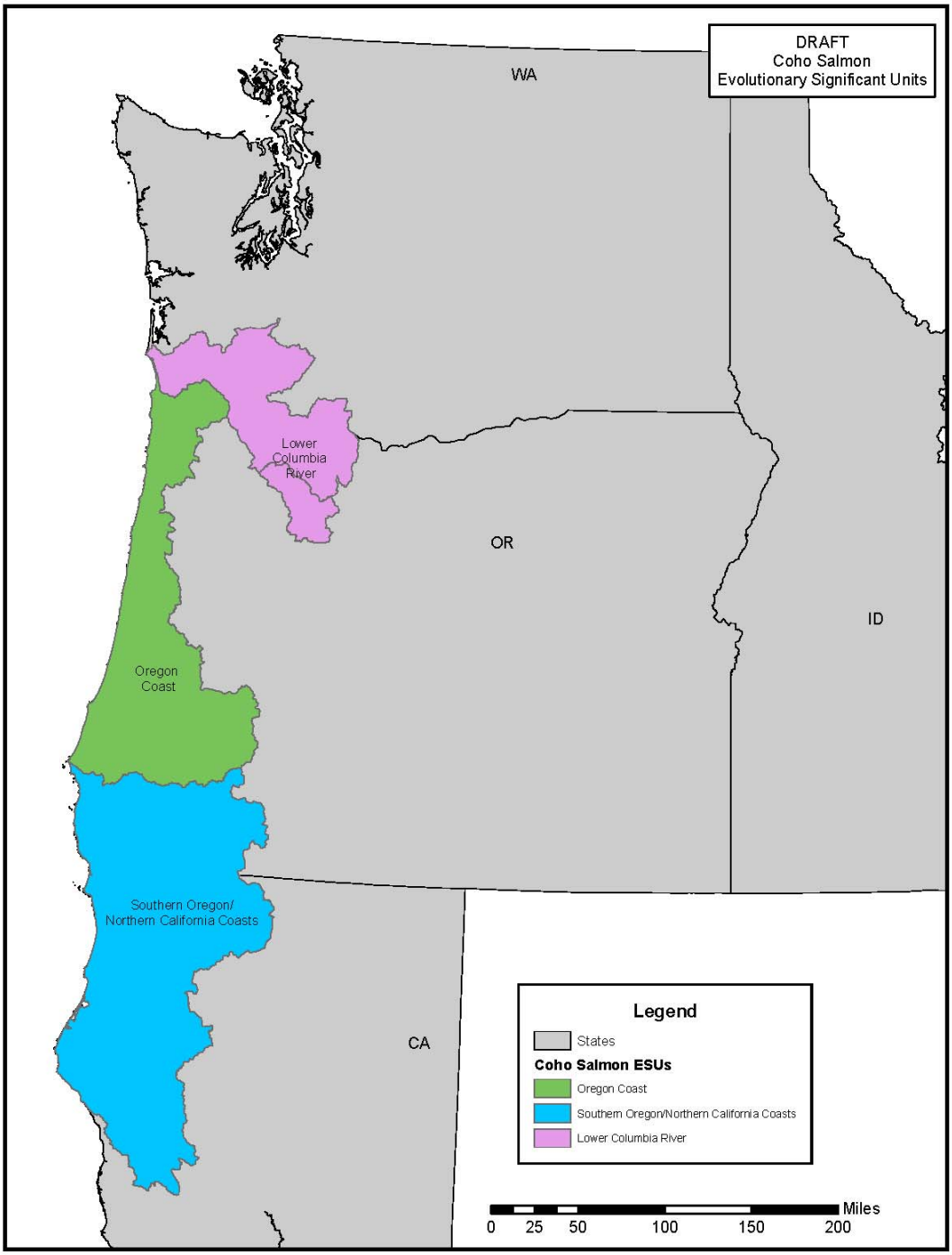

Figure 1-3. Evolutionarily Significant Units (ESUs) of coho salmon (*Oncorhynchus kisutch*) proposed for "threatened" status under the Endangered Species Act.

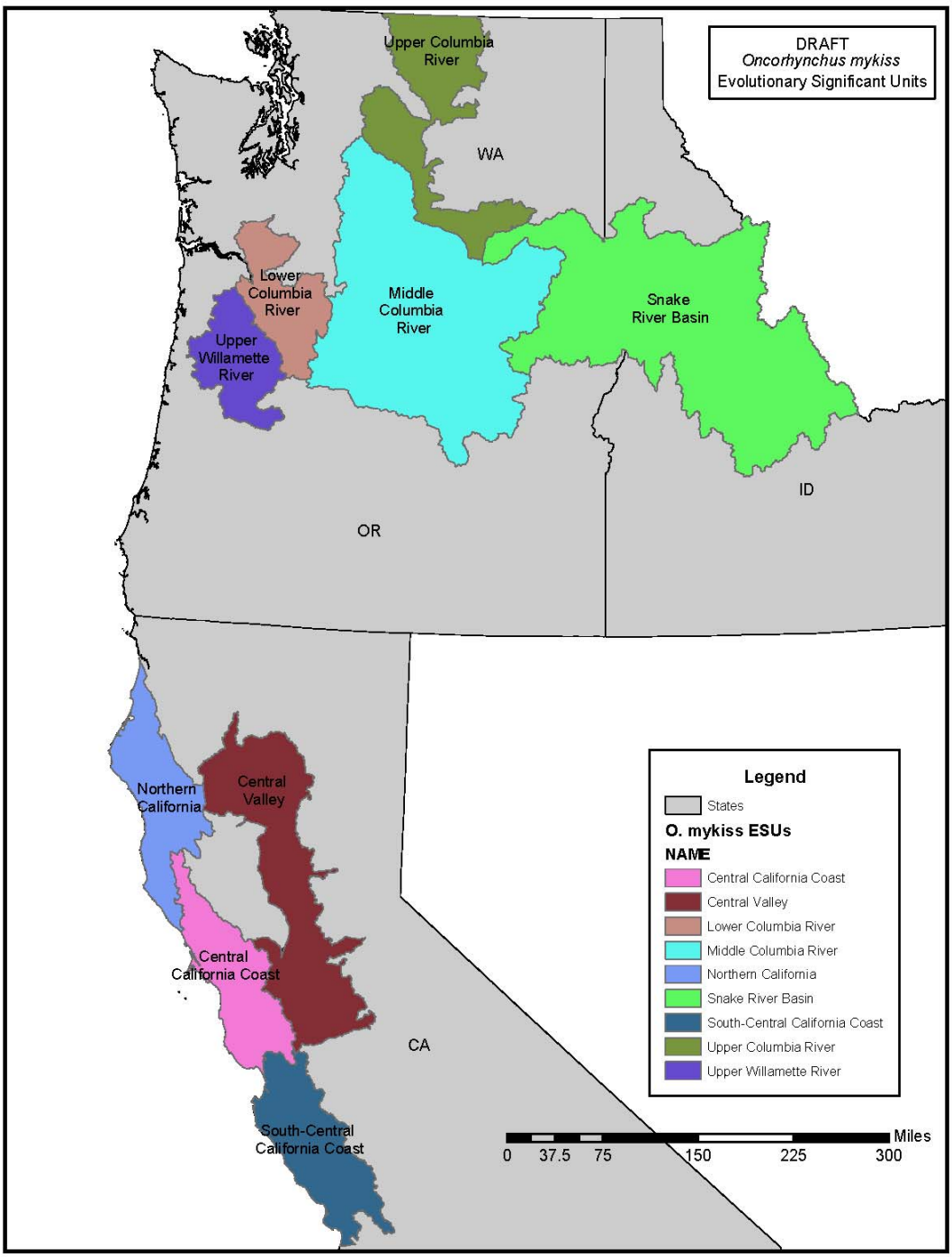

Figure 1-4. Evolutionarily Significant Units (ESUs) of *Oncorhynchus mykiss* (steelhead and co-ocurring rainbow trout) proposed for "threatened" status under the Endangered Species Act.

2. ALTERNATIVES, INCLUDING PROPOSED ACTION

This EA describes and evaluates two alternative actions for protection of threatened fish in 23 ESUs. The environmental impacts of the alternative actions were assessed relative to baseline conditions established by existing laws and regulations (including 4(d) protective regulations in the context of the ESA-listing landscape that would exist once the (non-discretionary) proposed listing determinations are finalized). This EA was prepared in accordance with Council on Environmental Quality regulations for implementing NEPA (40 Code of Federal Regulations Parts 1500-1508) and National Oceanographic and Atmospheric Administration environmental review implementing procedures (Administrative Order 216-6, May 20, 1999).

2.1 ALTERNATIVE 1 (NO ACTION)

This alternative consists of no revision to the current 4(d) take prohibitions, which would have the following effects:

(1) It would leave three ESUs, being newly proposed for threatened status, without 4(d) protective regulations (the Sacramento River winter-run chinook and Upper Columbia River *O. mykiss* ESUs which are currently listed as endangered, and the Lower Columbia River coho ESU which presently is designated as a candidate species).

(2) It would retain the inconsistent coverage of the various 4(d) limits on take prohibitions among threatened ESUs.

(3) It would apply the take prohibitions and applicable limits to newly listed hatchery fish and resident *O. mykiss* (rainbow trout).

The No Action alternative would result in all previously enacted 4(d) rules remaining in place, with no additions or amendments. There would be no take prohibition for two ESUs previously listed as endangered, but now listed as threatened – Upper Columbia River Steelhead and Sacramento winter-run chinook Salmon. The Lower Columbia River Coho ESU, formerly a candidate species and now proposed for a threatened listing, would not be protected by any take prohibition. The ESUs currently subject to 4(d) protective regulations would continue to be covered by the section 9(a) take prohibitions and applicable limits. Take of all newly listed hatchery fish and resident *O. mykiss* would also be prohibited, though subject to potential limitation of the application of the take prohibitions under one of the existing limits.

2.2 ALTERNATIVE 2 (PROPOSED ACTION)

This alternative consists of the following actions:

(1) Apply the 4(d) protections and 14 limits promulgated in 2000 (as modified in amendments (4) – (6) below) to two ESUs currently listed as endangered, but being proposed for threatened status (the Sacramento River winter-run chinook and Upper Columbia River *O. mykiss* ESUs).

(2) Apply the 4(d) protections and 14 limits promulgated in 2000 (as modified in amendments (4) – (6) below) to the Lower Columbia River coho ESU which is newly proposed for threatened status.

(3) Apply the 4(d) protections and 14 limits promulgated in 2000 (as modified in amendments (4) – (6) below) to the Snake River fall-run chinook, Snake River spring/summer-run chinook, Southern Oregon/Northern California Coast coho, Central Valley spring-run chinook, California Coastal chinook, and Northern California *O. mykiss* ESUs, thus bringing all threatened ESUs under the same 4(d) protective regulations.

(4) Amend the expired 4(d) limit (§223.203(b)(2)), which provided a temporary exemption for ongoing research with pending permit applications during the 2000 4(d) rulemaking, to temporarily exempt ongoing research during the current rulemaking process.

(5) Move the description of the limit for Tribal Resource Management Plans (§223.209) so that the text would appear next to the 4(d) rule in the Code of Federal Regulations, improving the clarity of the 4(d) regulations.

(6) Amend the current 4(d) rule so that the section 9(a) take prohibitions apply to anadromous fish with an intact adipose fin only (that is, the take prohibitions and 4(d) protective regulations would not apply to unclipped hatchery fish or resident *O. mykiss* included in the subject ESUs).

2.3 DESCRIPTION OF LIMITS ON TAKE PROHIBITIONS PROMULGATED IN 2000

Under Alternative 2, the proposed action alternative, NMFS would revise the current 4(d) protective regulations to bring all threatened ESUs under the same set of 14 4(d) take limits that were adopted in the 2000 rulemakings (65 FR 42422, July 10, 2000; 65 FR 42485, July 10, 2000,), with some modifications. The 2000 rulemakings included the following limits: (1) activities conducted in accordance with ESA section 10 or other authorization; (2) scientific or enhancement activities with pending applications at the time of rulemaking (note, the proposed alternative would remove this limit from the rule because it has expired); (3) emergency actions related to injured, stranded, or dead salmonids; (4) fishery management activities; (5) hatchery

and genetic management programs; (6) activities in compliance with joint Tribal/state plans developed within *United States* v. *Washington* or *United States*. v. *Oregon*; (7) scientific research activities permitted or conducted by the states; (8) state, local, and private habitat restoration activities; (9) properly screened water diversion devices; (10) routine road maintenance activities; (11) certain park pest management activities in Portland, Oregon; (12) certain municipal, residential, commercial, and industrial development and redevelopment activities; (13) forest management activities on state and private lands within the state of Washington; and (14) activities undertaken consistent with an approved tribal resource management plan. Some programs apply to only one ESU. A summary of each of the limitations as they apply to threatened salmonids is provided in Appendix A.

2.4 PROVIDE TAKE PROTECTION FOR THREE ESUS THAT WOULD OTHERWISE NOT BE PROTECTED

NMFS believes that the 4(d) take prohibitions and limitations are necessary and advisable for the conservation of the Sacramento winter-run chinook and Upper Columbia River *O. mykiss* ESUs, previously listed as endangered and now being proposed for threatened status, and for the Lower Columbia River Coho ESU, being proposed for the first time for threatened status. However, the take of listed fish in these three ESUs need not be prohibited when it results from activities meeting specified conservation standards. NMFS, therefore proposes to apply the ESA section 9(a) take prohibitions as well as the 14 4(d) limits promulgated in 2000 (amended as proposed) to these ESUs. The baseline condition for these ESUs is the lack of any take protections. The proposed action alternative would add coverage under amended 4(d) protective regulations for these three ESUs.

2.5 ALIGN AND SIMPLIFY EXISTING 4(D) PROTECTIVE REGULATIONS FOR ALL THREATENED SALMON AND *O. MYKISS*

Although the section 4(d) regulations for threatened salmonids have proven effective at appropriately protecting threatened salmonid ESUs and permitting certain activities, several of the limits are redundant, outdated, or are located disjunctly in the Code of Federal Regulations. The result is a complex set of 4(d) regulations that increases the administrative and regulatory burden of managing protective regulations for threatened ESUs. The current 4(d) regulations do not effectively convey to the public the specific ESUs for which certain activities may be exempted from the take prohibitions under 4(d). As part of the proposed listing determinations, NMFS proposes to clarify the existing section 4(d) protective regulations for threatened salmonids so that they are more consistent across ESUs and can be more efficiently and effectively accessed and interpreted by all affected parties.

The effect of these changes would be to clarify and simplify existing regulations to make the rule more transparent and understandable to co-managers and the public. But for the minor amendment to the limit providing temporary exemption for ongoing research activities with pending permit applications, there would be no change in terms of the activities that are allowed and prohibited with respect to listed fish, or the processes that must be followed and the criteria that must be met for a limitation of the take prohibitions to be authorized. The amended 4(d) rule would more effectively and efficiently convey the options available for limiting take prohibitions, and also would simplify the practical application of these limits in specific circumstances.

NMFS proposes aligning the 4(d) regulations by making the following specific changes: (1) NMFS proposes to apply the same set of limits to all threatened ESUs by bringing the Snake River fall-run chinook, Snake River spring/summer-run chinook, Southern Oregon/Northern California Coast coho, Central Valley spring-run chinook, California Coastal chinook, and Northern California *O. mykiss* ESUs under the 14 limits promulgated in 2000, as amended; (2) NMFS proposes to amend an expired limit (§223.203(b)(2)); and (3) NMFS proposes to move the description of the limit for Tribal Resource Management Plans (§223.209) so that the text would appear next to the 4(d) rule in the Code of Federal Regulations, thereby improving the clarity of the 4(d) regulations. These three clarifying changes are described in further detail in Appendix C.

2.6 PROHIBIT TAKE OF NEWLY LISTED HATCHERY FISH AND RESIDENT RAINBOW TROUT (*O. MYKISS)* ONLY TO THE EXTENT NECESSARY FOR CONSERVATION OF THE LISTED ESUS

NMFS proposes to amend the current 4(d) regulations to ensure that fisheries and artificial propagation programs are managed consistent with the conservation needs of ESA-listed ESUs. NMFS proposes to exclude listed hatchery fish marked by a clipped adipose fin from section 4(d) protections. (The clipping of adipose fins in hatchery fish just prior to release into the natural environment is a common method for marking hatchery production.) NMFS believes this approach would provide needed flexibility to appropriately manage artificial propagation and direct take of threatened salmon and *O. mykiss* for the conservation and recovery of these ESUs.

Not all hatchery stocks considered part of listed ESUs are of equal utility in conservation and recovery. Certain ESU hatchery stocks may comprise a substantial portion of the genetic diversity remaining in a threatened ESU and are essential for ongoing and future recovery efforts. If released with adipose fins intact, hatchery fish in these populations would be afforded protections under section 4(d) (i.e., their take would be prohibited). Other hatchery stocks,

although considered part of a threatened ESU, may have limited or uncertain conservation value. In some cases, they may even harm conservation of the ESU. Artificial propagation programs producing these populations could release adipose-fin-clipped fish, such that 4(d) protections would not apply, and these fish could be available for other purposes (e.g., fulfilling federal trust and Tribal treaty obligations) while preserving all future recovery options. Additionally, NMFS may have to allow take of listed hatchery stocks to manage the number of hatchery fish allowed to spawn naturally to limit potential adverse effects to spawning natural-origin fish.

Pursuant to the Court's order in *Alsea* decision, NMFS also now proposes to list entire ESUs of resident *O. mykiss*, including both the anadromous form (steelhead) and the resident form (rainbow trout) where they occur in the same area. Once the proposed *O. mykiss* listings are finalized, absent amendments to the current 4(d) protective regulations, the take of resident rainbow trout would be prohibited (i.e., the no action alternative). The effect of the proposed action alternative relative to the baseline analyzed in this EA is that the take of resident *O. mykiss* would not be prohibited. NMFS believes it does not have sufficient information at this time about the conservation status of rainbow trout to determine that it is necessary and advisable to prohibit their take. Nevertheless, because juvenile steelhead are difficult to distinguish from rainbow trout, the ESA currently requires state fish and wildlife agencies to regulate rainbow trout fisheries to protect listed steelhead. NMFS expects that state regulations would remain in place.

2.7 OTHER PROTECTIVE PROVISIONS OF THE ESA

Section 7(a)(4) of the ESA requires that federal agencies confer with NMFS on any actions likely to jeopardize the continued existence of a species proposed for listing and on actions likely to result in the destruction or adverse modification of proposed critical habitat. For listed species, section 7(a)(2) requires federal agencies to ensure that activities they authorize, fund, or conduct are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a federal action may affect a listed species or its critical habitat, the responsible federal agency must enter into consultation with NMFS. Examples of federal actions likely to affect salmon and *O. mykiss* include authorized land management activities of the U.S. Forest Service and the U.S. Bureau of Land Management, as well as operation of hydroelectric and storage projects of the U.S. Bureau of Reclamation and U.S. Army Corps of Engineers (COE). Such activities include timber sales and harvest, permitting livestock grazing, hydroelectric power generation, and flood control. Federal actions, including the COE section 404 permitting activities under the Clean Water Act, COE permitting activities under the River and Harbors Act, Federal Energy Regulatory Commission licenses for non-federal development and operation of hydropower, and federal salmon hatcheries, may also require consultation.

Sections 10(a)(1)(A) and 10(a)(1)(B) of the ESA provide NMFS authority to permit take that would otherwise be prohibited by the ESA. Section 10(a)(1)(A) scientific research and enhancement permits may be issued to entities (federal and non-federal) conducting research that involves a directed take of listed species. A directed take refers to the intentional take of listed species. NMFS has issued section 10(a)(1)(A) research/enhancement permits for currently listed salmon and *O. mykiss* ESUs for a number of activities, including trapping and tagging, electroshocking to determine population presence and abundance, removal of fish from irrigation ditches, and collection of adult fish for artificial propagation programs. Section 10(a)(1)(B) incidental take permits may be issued to non-federal entities performing otherwise lawful activities that may incidentally take listed species. Types of activities potentially requiring a section 10(a)(1)(B) incidental take permit include operation and release of artificially propagated fish by state or privately operated and funded hatcheries; state or academic research not receiving federal authorization or funding; implementation of state fishing regulations; or logging, road building, grazing, and diverting water into private lands.

2.8 ALTERNATIVES CONSIDERED BUT NOT ANALYZED

NMFS considered three additional possible alternatives that are not analyzed in this document. The first of these was removal of all take provisions for threatened ESUs. This alternative would reflect a decision by NMFS that no protective regulations are needed for the conservation of the 23 ESUs proposed for listing as threatened. NMFS did not analyze this alternative because it does not meet the purpose and need of providing protection to the threatened ESUs. Existing controls are inadequate for the protection and conservation of these 23 ESUs, consequently, this alternative would be inconsistent with the requirements of the ESA.

The second possible alternative considered but not analyzed would consist of a blanket prohibition on take, with none of the limits contained in the current 4(d) rules. This alternative was previously analyzed in the 2000 4(d) limits EA, in which NMFS determined that it would not meet the purpose and need of providing an adequate level of protection to the threatened ESUs while also approving activities that are necessary and compatible with conservation (NMFS 2000b, 2000c, 2000d, 2000e, 2000f, 2000g).

The third possible alternative considered but not analyzed would consist of extending the 4(d) protections and 14 limits promulgated in 2000 to only the three ESUs newly being proposed for threatened status (two previously endangered ESUs, the Sacramento River winter-run chinook and Upper Columbia River *O. mykiss* ESUs; and one ESU previously identified as a candidate species, the Lower Columbia River coho ESU). NMFS did not analyze this alternative because it does not meet the purpose and need of the action. Although, this alternative would ensure that these three ESUs would have the necessary protections under the ESA, it does not standardize

and simplify the 4(d) protection for all 23 ESUs proposed for threatened status, nor does it provide protection of hatchery fish and resident rainbow trout proposed for listing only to the extent required for the conservation of the listed ESUs.

3. AFFECTED ENVIRONMENT

As discussed in Chapter 4, Subsection 4.1, this EA does not include analyses of site-specific resources since it analyzes policy changes rather than implementation of those policy decisions. However, general and broad impacts can be assessed for those resources that could be affected by the policy changes that would occur under either alternative. The potential impacts would likely be limited to the following resources: fish (i.e., ESUs), recreation, socioeconomics, federal trust and treaty responsibilities to Tribes, environmental justice, and water quality. No other resources are expected to be impacted by the proposed changes, so they were not included in the Affected Environment discussion, or in Chapter 4, Environmental Consequences.

3.1 FISH/ESU DESCRIPTIONS

3.1.1 *Ozette Lake Sockeye*

The Ozette Lake Sockeye ESU consists of sockeye salmon that return to Ozette Lake through the Ozette River and currently spawn primarily in lakeshore upwelling areas in Ozette Lake. Some spawning may also occur downstream of Ozette Lake in the Ozette River or in Coal Creek, a tributary to the Ozette River. The peak harvest of sockeye salmon in the Ozette Lake area was 18,000 fish in 1949. Only one artificial propagation program is considered to be part of the Ozette Lake Sockeye salmon ESU (Appendix B). The program, operated by the Makah Tribe, is derived from native broodstock and has the primary objective of establishing self-sustaining sockeye salmon spawning aggregations in two Ozette Lake tributaries where spawning has not been observed for many decades.

Commercial harvest ended in 1974, and no recreational or ceremonial subsistence fisheries have occurred since 1982. Despite of the curtailment of these fisheries, Ozette Lake Sockeye have not returned to tributaries to spawn, which may be the primary reason why run size has not increased. Investigators have cited three main problems related to road-building and logging that have limited stream spawning habitat: increased magnitude and frequency of peak flows, stream-bed scouring, and degraded water quality. Ozette Lake kokanee, which spawn primarily in tributaries to Ozette Lake and have been observed spawning in lakeshore upwelling areas, are not considered part of this ESU because of the very large genetic difference between this fish and the lake spawning sockeye; however, resident sockeye observed spawning in Ozette Lake with anadromous sockeye are included in this ESU.

The western shore of the lake is part of the Olympic National Park, and the remainder of the land surrounding the lake is privately owned. The Makah and Quileute Native American tribes have land adjacent to the lake, on the north and south sides, respectively. Outside that portion in Olympic National Park, virtually the entire watershed of Ozette Lake has been logged.

3.1.2 *Central Valley Spring-run Chinook*

The Central Valley Spring-run chinook ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries in California (64 FR 50394; September 16, 1999). This ESU does not include any artificially propagated stocks that reside within the historical geographic range of the ESU.

Extensive construction of dams throughout the Sacramento-San Joaquin basin has reduced the California Central Valley ESU to only a small portion of its historical distribution, generating concerns about risks to the spatial structure and diversity of the ESU. The ESU has been reduced to only three extant natural populations from an estimated 27 historical populations. The remaining spring-run chinook populations (Mill, Deer, and Butte Creek tributaries to the Sacramento River) are in close geographic proximity, increasing the ESU's vulnerability to disease or catastrophic events. Although the recent 5-year mean abundance for the three ESU populations remains small (ranging from nearly 500 to over 4,500 spawners), short- and long-term productivity trends are positive, and population sizes have shown continued increases over the abundance levels of the 1980s (with 5-year mean population sizes of 67 to 243 spawners).

The Feather River Spring-run chinook Hatchery (not considered part of the ESU, Appendix B) may also represent a risk factor for the extant ESU natural populations. The Feather River Hatchery produces fish that are genetically more similar to fall chinook, probably due to hybridization at the facility. The off-site release location for the hatchery is believed to contribute to a high straying rate of hatchery fish, which increases the likelihood of non-ESU hatchery fish interacting adversely with ESU natural populations. The one spring chinook artificial propagation program that operates in the Central Valley (the Feather River Hatchery) is not considered part of this ESU because it is believed to have hybridized with fall chinook salmon propagated at the same hatchery. Hatchery production is released off-site and is, therefore, more likely to stray from the Feather River basin to those watersheds supporting naturally reproducing spring chinook populations (e.g., in Butte Creek, Deer Creek, and Mill Creek).

3.1.3 *Sacramento River Winter-run Chinook*

The Sacramento winter-run chinook ESU includes all naturally spawned populations of winter-run chinook salmon in the Sacramento River and its tributaries in California (59 FR 440; January 1, 1994), as well as two artificial propagation programs (Appendix B).

NMFS and others have undertaken major efforts over the past decade to assess the viability of, and conduct research on, the winter run chinook population; implement freshwater and ocean harvest management conservation efforts; and implement a wide range of habitat conservation measures. The State of California has listed winter-run chinook under the California Endangered Species Act, implemented freshwater harvest management conservation measures, and increased monitoring and assessment efforts in support of conserving this ESU. Harvest and habitat conservation efforts have substantially benefited ESU abundance and productivity over the past decade. These efforts include changes in Central Valley Project (CVP) and State Water Project operations and other actions undertaken pursuant to implementation of the CVP Operations Criteria and Procedures biological opinion that have increased freshwater survival, changes in salmon ocean harvest pursuant to the ocean harvest biological opinion that have increased ocean survival and adult escapement, implementation of habitat restoration efforts throughout the central valley as a result of the California Bay-Delta Authority Program, and other central valley habitat restoration projects.

A key concern is the lack of diversity within this ESU and the fact that a single extant population represents it at present. However, significant efforts are underway through the California Bay-Delta Authority Program ecosystem restoration program to restore habitat and anadromous fish access to Battle Creek, which would provide an opportunity for this ESU to establish a second population.

3.1.4 *California Coastal Chinook*

The California Coastal chinook ESU includes all naturally spawned populations of chinook salmon from rivers and streams south of the Klamath River to the Russian River, California (64 FR 50394; September 16, 1999). Seven artificial propagation programs are considered to be part of the ESU (Appendix B).

Evaluation of the viability of the naturally spawning component of the California Coastal chinook ESU is hindered by the limited availability of data, particularly regarding the abundance and spatial distribution of natural populations within the ESU. Additionally, the data that are available are of varying type, quality, and temporal coverage and are generally not amenable to rigorous estimation of abundance or robust statistical analyses of trends. The little historical and current abundance information that is available indicates that (putative) natural ESU population

abundance levels remain depressed relative to historical levels. Evidence suggests that populations have been extirpated or nearly extirpated in the southern part of the ESU, or are extremely low in abundance. This observation, combined with the apparent loss of the spring-run chinook life history in the Eel River Basin and elsewhere in the ESU, indicates risks to the diversity of the ESU. Recently available natural abundance estimates in the Russian River exceed 1,300 fish for 2000 to 2002. These data suggest either the presence of a naturally producing population in the Russian River, or represent straying from other basins or ESUs. No data are available to assess the genetic relationship of the Russian River fish to populations in this or other ESUs.

3.1.5 *Upper Willamette River Chinook*

The Upper Willamette River chinook ESU includes all naturally spawned populations of spring-run chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon (64 FR 14208; March 24, 1999). Five artificially propagated stocks are considered to be part of the ESU (Appendix B).

There are no direct estimates of natural-origin spawner abundance for the Upper Willamette River chinook ESU. The abundance of adult spring chinook salmon (hatchery and natural fish) passing Willamette Falls has remained relatively steady over the past 50 years (ranging from approximately 20,000 to 70,000 fish), but is only a fraction of peak abundance levels observed in the 1920s (approximately 300,000 adults). Interpretation of abundance levels is confounded by a high but uncertain fraction of hatchery produced fish. The McKenzie River population has shown substantial increases in total abundance (hatchery origin and natural origin fish) in the last two years, while trends in other natural populations in the ESU are generally mixed.

With the relatively large incidence of naturally spawning hatchery fish in the ESU, it is difficult to determine trends in productivity for natural-origin fish. Despite improving trends in total productivity (including hatchery origin and natural origin fish) since 1995, productivity would be below replacement in the absence of artificial propagation. Approximately 30 to 40 percent of historical total habitat is now inaccessible behind dams. The habitat that is not blocked represents a much larger proportion of the historical *spawning* habitat. The restriction of natural production to just a few areas increases the ESU's vulnerability to environmental variability and catastrophic events. Losses of local adaptation and genetic diversity through the mixing of hatchery stocks within the ESU, and the introgression of out-of-ESU hatchery fall-run chinook, have represented threats to ESU diversity. The recent cessation of the fall-run hatchery, as well as improved marking rates of hatchery fish to assist in monitoring and in the management of a marked-fish selective fishery, are encouraging improvements.

3.1.6 *Lower Columbia River Chinook*

The Lower Columbia River chinook ESU includes all naturally spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River (64 FR 14208; March 24, 1999). Eleven artificially propagated stocks are considered to be part of the ESU (Appendix B). All of these programs are designed to produce fish for harvest, with three of these programs also being implemented to augment the naturally spawning populations in the basins where the fish are released.

Many populations within the Lower Columbia River chinook ESU have exhibited pronounced increases in abundance and productivity in recent years, possibly due to improved ocean conditions. Abundance estimates of naturally spawned populations in this ESU are, however, uncertain due to a high (approximately 70 percent) fraction of naturally spawning hatchery fish and a low marking rate (only one to two percent) of hatchery-produced fish. Abundance estimates of naturally produced spring chinook have improved since 2001 due to the marking of all hatchery spring chinook releases, allowing for the enumeration of hatchery spring chinook and weirs, traps, and on spawning grounds. Despite recent improvements, long-term trends in productivity are below replacement for most populations in the ESU. It is estimated that eight to ten historical populations in the ESU have been extirpated or nearly extirpated. Although approximately 35 percent of historical habitat has been lost in this ESU due to the construction of dams and other impassable barriers, this ESU exhibits a broad spatial distribution in a variety of watersheds and habitat types. Natural production currently occurs in approximately 20 populations, although only one population has a mean spawner abundance exceeding 1,000 fish. There is concern that the spring-run populations comprise most of the extirpated populations. The disproportionate loss of the spring-run life history represents a risk for ESU diversity.

Additionally, of the four hatchery spring-run chinook populations considered to be part of this ESU, two are propagated in rivers that are within the historical geographic range of the ESU but that likely did not support spring-run populations. High hatchery production in the Lower Columbia River poses genetic and ecological risks to the natural populations in the ESU and complicates assessments of their performance.

3.1.7 *Puget Sound Chinook*

The Puget Sound chinook ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the

Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound, and the Strait of Georgia in Washington (64 FR 14208; March 24, 1999). Twenty-two artificially propagated stocks are considered to be part of the ESU (Appendix B). Five of the programs are directed at conservation and are specifically implemented to preserve and increase the abundance of native populations in their natal watersheds where habitat needed to sustain the populations naturally at viable levels has been lost or degraded. The remaining programs considered to be part of the ESU are operated primarily for fisheries harvest augmentation purposes (some of which also function as research programs) using transplanted within-ESU-origin chinook salmon as broodstock.

Although populations in the ESU have not experienced the dramatic increases in abundance in the last two to three years that have been evident in many other ESUs, more populations have shown modest increases in escapement in recent years than have declined (13 populations versus 9). Most populations have a recent 5-year mean abundance of fewer than 1,500 natural spawners, with the Upper Skagit population being a notable exception (the recent 5-year mean abundance for the Upper Skagit population approaches 10,000 natural spawners). Currently observed abundances of natural spawners in the ESU are several orders of magnitude lower than estimated historical spawner capacity and well below peak historical abundance (approximately 690,000 spawners in the early 1900s). Recent 5-year and long-term productivity trends, however, remain below replacement for the majority of the 22 extant populations of Puget Sound chinook. The Puget Sound Technical Recovery Team has identified 31 historical populations (Ruckelshaus *et al*. 2002), of which nine are believed to be extinct, most of which were "early run" or "spring" populations. Past hatchery practices that transplanted stocks among basins within the ESU, and present programs using transplanted stocks that incorporate little local natural broodstock, represent additional risk to ESU diversity.

3.1.8 *Snake River Fall-run Chinook*

The Snake River fall-run chinook ESU includes all naturally spawned populations of fall-run chinook salmon in the mainstem Snake River and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasins (57 FR 14653, April 22, 1992; 57 FR 23458, June 3, 1992). Three artificially propagated stocks are considered to be part of the ESU (Appendix B), all based on the Lyons Ferry Hatchery stock. When naturally spawning fall chinook declined to fewer than 100 fish in 1991, most of the genetic legacy of this ESU was preserved in the Lyons Ferry Hatchery broodstock (NMFS 1991a). These three programs are managed to enhance listed Snake River fall chinook salmon and presently include the Lyons Ferry Hatchery, Nez Perce Tribal Hatchery, and Oxbow Hatchery (an Idaho Power Company mitigation hatchery).

The abundance of natural-origin spawners in the Snake River fall-run chinook ESU for 2001 (2,652 adults) exceeded 1,000 fish for the first time since counts began at the Lower Granite dam in 1975. The recent 5-year mean abundance of 871 naturally produced spawners, however, generated concern that despite recent improvements the abundance level is very low for an entire ESU. With the exception of the marked increase in 2001, the ESU has fluctuated between approximately 500 to 1,000 natural spawners since 1975, suggesting a higher degree of stability in growth rate at low population levels than is seen in other salmonid populations. Increasing returns reflect improved ocean conditions, in part, improved management of the mainstem hydrosystem flow regime, and an increasing contribution from the Lyons Ferry Hatchery supplementation program. Due to the large fraction of naturally spawning hatchery fish, however, it is difficult to assess the productivity of the natural population. Depending upon the assumption made regarding the reproductive contribution of hatchery fish, long-term and short-term trends in productivity are at or above replacement. It is estimated that approximately 80 percent of historical spawning habitat was lost with the construction of a series of Snake River mainstem dams. The loss of spawning habitats and the restriction of the ESU to a single extant naturally spawning population increases the ESU's vulnerability to environmental variability and catastrophic events.

3.1.9 *Snake River Spring/Summer-run Chinook*

The Snake River spring/summer-run chinook ESU includes all naturally spawned populations of spring/summer-run chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (57 FR 23458; June 3, 1992). Nine artificial propagation programs produce spring/summer-run chinook salmon that are considered to be part of the Snake River spring/summer-run chinook ESU (Appendix B). A portion of these programs are managed to enhance listed natural populations, including the use of captive broodstock hatcheries in the upper Salmon River, Lemhi River, East Fork Salmon River, and Yankee Fork populations. These enhancement programs all use broodstock founded from the local native populations, and have increased the number of fish spawning naturally in several historical production areas.

Currently, the use of non-ESU broodstock sources is restricted to Little Salmon/Rapid River (lower Salmon River tributary), mainstem Snake River at Hells Canyon, and the Clearwater River. These non-ESU programs appear to be isolated from natural production areas and are thought to have little adverse impact on this ESU.

3.1.10 *Southern Oregon/Northern California Coast Coho*

The Southern Oregon/Northern California Coast Coho ESU includes all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California (62 FR 24588; May 6, 1997). Three artificially propagated stocks are considered to be part of the ESU (Appendix B).

The only reliable time series of adult abundance for the Southern Oregon/Northern California Coast Coho ESU is for the Rogue River population in Oregon. The California portion of the ESU is characterized by scarce data, with only a few available spawner indices and presence-absence surveys. The recent 5-year mean abundance for the Rogue River is approximately 5,000 natural spawners, and is the highest such abundance for the Rogue River data series (since 1980). Both long- and short-term productivity trends for Rogue River natural spawners are above replacement. These positive trends for the Rogue River population most likely reflect the effects of reduced harvest rather than improved freshwater conditions and population productivity (NMFS 2003b). Less reliable indices of spawner abundance in several California populations suggest flat or declining trends. Relatively low levels of observed presence in historically occupied coho streams (32 to 56 percent from 1986 to 2000) indicate continued low abundance in the California portion of this ESU. Indications of strong 2001 returns in several California populations, presumably due to favorable freshwater and ocean conditions, is encouraging but must be evaluated in the context of more than a decade of generally poor performance. Nonetheless, the high occupancy rate of historical streams in 2001 suggests that much habitat remains accessible to coho salmon. Although extant populations reside in all major river basins within the ESU, the loss of local populations in the Trinity, Klamath, and Rogue River systems is a concern (NMFS 2003b). The high hatchery production in these systems may mask trends in ESU population structure, and pose risks to ESU diversity. The termination of several out-of-ESU hatcheries in California is expected to mitigate risks to ESU diversity.

3.1.11 *Oregon Coast Coho*

The Oregon Coast Coho ESU includes all naturally spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco (63 FR 42587; August 10, 1998). Five artificially propagated stocks are considered part of the ESU (Appendix B). All of these programs are operated by the state of Oregon to provide harvest opportunities. Substantial changes in coho salmon propagation have occurred over the previous ten years to achieve a balance between obligations to help conserve coastal coho and to mitigate for habitat degradation, and maintain fishing opportunities. These changes include a dependence on local origin fish for broodstock, management actions to reduce straying (ten percent is the objective), and cessation of stocking coho in five coastal rivers. Coastal coho stocking has decreased by 84 percent since 1993.

The abundance of natural spawners in the Oregon Coast Coho ESU for 2001 and 2002 (163,000 and 264,000 spawners, respectively) far exceeded the abundance observed for the past several decades, and preliminary projections for 2003 (approximately 118,000 spawners) suggest that these substantial increases may be sustained. Furthermore, increases in natural spawner abundance have occurred in many populations in the northern portion of the ESU (i.e., populations that were the most depressed at the time of the last review) (NMFS 1997). When the abundance data are evaluated by coho brood year, however, it is apparent that the strong year-classes of the last three years were preceded by three years of recruitment failure. Recruitment failure (meaning that a given year-class of natural spawners failed to replace itself when its offspring returned to the spawning grounds three years later) occurred for the 1994, 1995, and 1996 brood years returning in 1997, 1998, and 1999, respectively. These three years of recruitment failure are the only such instances that have been observed in the entire time series of data collected for Oregon Coast coho salmon. The long-term trends in ESU productivity are still negative due to the poor performance of the 1994 to 1996 brood years. The degradation of many lake habitats and the resultant impacts on several lake populations in the Oregon Coast Coho ESU also pose risks to ESU diversity.

3.1.12 *Lower Columbia River Coho (Candidate Species)*

The Lower Columbia River Coho ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia, up to and including the Big White Salmon and Hood Rivers. Nine artificially propagated stocks are considered to be part of the ESU (Appendix B).

There are only two extant populations in the Lower Columbia River Coho ESU with appreciable natural production (the Clackamas and Sandy River populations), from an estimated 23 historical populations in the ESU. Although adult returns in 2000 and 2001 exhibited moderate increases, the recent 5-year mean of natural-origin spawners for the two populations represents less than 1, 500 adults. The Sandy River population has exhibited recruitment failure in five of the last ten years, and has exhibited a poor response to reductions in harvest. During the 1980s and 1990s, natural spawners were not observed in the lower tributaries in the ESU. Coincident with the 2000-2001 abundance increases in the Sandy and Clackamas populations, a small number of coho spawners of unknown origin have been surveyed in some lower tributaries. Short- and long-term trends in productivity are below replacement.

Approximately 40 percent of historical habitat is currently inaccessible, which restricts the number of areas that might support natural production, and further increases the ESU's vulnerability to environmental variability and catastrophic events. The extreme loss of naturally

spawning populations, the low abundance of extant populations, diminished diversity, and fragmentation and isolation of the remaining naturally produced fish result in considerable risks to the ESU. The small number of naturally produced spawners in this ESU contrasts with the very large number of hatchery-produced adults. The abundance of hatchery coho returning to the Lower Columbia River in 2001 and 2002 exceeded one million and 600,000 fish, respectively. Although the scale of hatchery production poses genetic and ecological threats to the extant natural populations in the ESU, collectively these hatchery stocks represent a substantial portion of the ESU's remaining genetic resources. Natural populations in smaller tributaries near the mouth of the Columbia River are largely extinct. Some of the ESU hatchery stocks (e.g., the Big Creek hatchery stock) are preserving the remaining genetic resources of the historical gene pool, and other populations are preserving diversity in run timing that has been impacted by the timing of the in-river harvest and artificial selection in hatcheries.

3.1.13 *Columbia River Chum*

The Columbia River Chum ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon (64 FR 14508; March 25, 1999). Three artificially propagated stocks are considered to be part of the ESU (Appendix B). These are conservation programs designed to support natural production and all use naturally produced adults for broodstock. These programs were only recently established (1998 to 2002), with the first hatchery chum returning in 2002.

Approximately 90 percent of the historical populations in the Columbia River Chum ESU are extirpated, or nearly so. During the 1980s and 1990s, the combined abundance of natural spawners for the Lower and Upper Columbia River Gorge, Washougal, and Grays River populations was below 4,000 adults. In 2002, however, the abundance of natural spawners exhibited a substantial increase evident at several locations in the ESU. The preliminary estimate of natural spawners is approximately 20,000 adults. The cause of this dramatic increase in abundance is unknown. Improved ocean conditions, the initiation of a supplementation program in the Grays River, improved flow management at Bonneville Dam, favorable freshwater conditions, and increased survey sampling effort may all have contributed to the elevated 2002 abundance. Long- and short-term productivity trends for ESU populations, however, are at or below replacement. The loss of off-channel habitats and the extirpation of approximately 17 historical populations increase the ESU's vulnerability to environmental variability and catastrophic events. The populations that remain are low in abundance and have limited distribution and poor connectivity.

3.1.14 *Hood Canal Summer-run Chum*

The Hood Canal summer-run ESU includes summer-run chum salmon populations in Hood Canal in Puget Sound and in Discovery and Sequim Bays on the Strait of Juan de Fuca. It may also include summer-run chum salmon in the Dungeness River, but the existence of that run is uncertain. The summer-run spawn from mid-September to mid-October. Eight artificially propagated stocks are considered to be part of the ESU (Appendix B).

Adult returns for some populations in the Hood Canal summer-run Chum ESU showed modest improvements in 2000, with upward trends continuing in 2001 and 2002. The recent 5-year mean abundance varies among populations in the ESU, ranging from 1 to nearly 4,500 fish. Hood Canal summer-run Chum is the focus of an extensive rebuilding program developed and implemented since 1992 by the state and Tribal co-managers. Two populations (the combined Quilcene and Union River populations) are above the conservation thresholds established by the rebuilding plan; however, most populations remain depressed. Estimates of the fraction of naturally spawning hatchery fish exceed 60 percent for some populations, indicating that reintroduction programs are supplementing the numbers of total fish spawning naturally in streams. Long-term trends in productivity are above replacement for only the Quilcene and Union River populations. Buoyed by recent increases, seven populations are exhibiting short-term productivity trends above replacement. Of an estimated 16 historical populations in the ESU, seven populations are believed to have been extirpated or nearly extirpated. Most of these extirpations have occurred in populations on the eastern side of Hood Canal, generating additional concern for ESU spatial structure.

3.1.15 *Consideration of Resident O. mykiss Populations in Listing Determinations*

In addition to an anadromous *O. mykiss* life history (i.e., steelhead), *O. mykiss* exhibits non-anadromous or resident forms (i.e., rainbow trout). Where the two forms co-occur, the offspring of resident fish may migrate to the sea, and the offspring of anadromous fish may remain in streams as resident fish. The change from the anadromous life form to the resident life form can also result from imposed physical or physiological barriers to migration. Studies of genetic differences have indicated greater differences among geographically separated *O. mykiss* populations of the same life-history form than between anadromous and resident life-history forms in the same geographical area. No suite of morphological or genetic characteristics has been found that consistently distinguishes between the two life-history forms.

In its previous status reviews of steelhead ESUs, NMFS concluded that the available data suggest that resident rainbow trout and steelhead in the same area generally share a common gene pool (at least over evolutionary time periods) and included resident and anadromous populations in the same ESU. Resident populations above long-standing natural barriers, and

those populations that have resulted from the introduction of non-native trout, were not considered part of these ESUs. In the case of resident populations upstream of impassable human-caused migration barriers (e.g., large mainstem hydroelectric dams), NMFS found insufficient information to merit their inclusion in steelhead ESUs. The agency generally concluded that resident populations upstream of impassable man-made barriers must be evaluated on a case-by-case basis as more information becomes available on their relationships to below-barrier populations, or on the role these above-barrier resident populations might play in conserving below-barrier populations of *O. mykiss.*

In previous ESA listing determinations, NMFS did not list resident populations when it was determined that the entire ESU warranted listing. As noted above, the *Alsea* Court rejected the practice of listing only a subset of an ESU, or distinct population segment under the ESA (*Alsea Valley Alliance* v. *Evans* [161 F. Supp. 2d 1154, D. Oreg. 2001]). A key effect of NMFS' proposed listing determinations, therefore, is that previously unlisted below-barrier rainbow trout will now be listed.

3.1.16 *South-central California Coast O. mykiss*

The South-Central California Coast *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams from the Pajaro River (inclusive) to, but not including, the Santa Maria River, California (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the South-Central California Coast *O. mykiss* ESU. The ESU status of native resident populations above recent (usually manmade) impassable barriers, but below natural barriers, was not resolved. These resident populations would not be part of the South-Central California Coast *O. mykiss* ESU until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. There are no artificial propagation programs that produce fish considered to be part of the South-Central California *O. mykiss* ESU (Appendix B).

There is little abundance information for the South-Central California Coast *O. mykiss* ESU. Data are not available for the two largest river systems in the ESU, the Pajaro and Salinas basins. These systems are degraded and are expected to have steelhead runs reduced in size from historical levels. Data available for the Carmel River underscore the population's vulnerability to drought conditions, as well as its dependence on the intensive management of the river system. The most recent 5-year mean abundance of fish in the Carmel River is approximately 600 adults. Despite observed and inferred declines in abundance, the current spatial distribution of the anadromous life form in the ESU does not appear to be much reduced from what occurred

historically. *O. mykiss* are present in approximately 86 to 95 percent of historically occupied streams (the uncertainty in the estimated occupancy is due to three streams that could not be accessed for population surveys). The Pajaro and Salinas basins are spatially and ecologically distinct from other ESU populations, such that further degradation of these areas would adversely impact ESU spatial structure and diversity. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted.

3.1.17 *Central California Coast O. mykiss*

The Central California Coast *O. mykiss* ESU includes all naturally spawned populations of steelhead in California streams from the Russian River to Aptos Creek, as well as the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Central California Coast *O. mykiss* ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered part of the Central California Coast *O. mykiss* ESU until significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. Recent genetic data regarding three subpopulations of native fish above Rubber Dam 1 on Alameda Creek strongly suggests that they should be considered part of the ESU. Nielson (2003) found that these subpopulations were more similar to each other and other populations within the ESU than they were to populations outside the ESU. NMFS, therefore, considers native resident *O. mykiss* populations above Dam 1 on Alameda Creek to be part of the Central California Coast *O. mykiss* ESU.

Two artificially propagated stocks are considered to be part of the ESU (Appendix B). The hatchery on the Russian River is large-scale program intended to provide recreational fishing opportunities, as well as to augment local steelhead abundance. The hatchery on Scott Creek is a much smaller-scale program, incorporates natural-origin fish from Scott Creek and nearby San Lorenzo Creek for broodstock, and is intended to augment the local natural population.

There are no time series of population data for the Central California Coast *O. mykiss* ESU. The population in the largest river system in the ESU, the Russian River, is believed to have declined sevenfold since the mid-1960s. Juvenile density information is available for five "representative" populations, and each exhibits a downward decline over the last eight years of available data. Predation by increasing numbers of California sea lions at river mouths and during the ocean phase was noted as a recent development also posing significant risk. Juvenile

O. mykiss have been observed in approximately 82 percent of historically occupied streams, indicating that the ESU continues to be spatially well distributed. Impassible dams have, however, cut off substantial portions of spawning habitat in some basins, generating concern about ESU spatial structure. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted.

3.1.18 *Northern California O. mykiss*

The Northern California *O. mykiss* ESU includes steelhead in California coastal river basins from Redwood Creek south to the Gualala River (inclusive) (65 FR 36074; June 7, 2000). Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Northern California *O. mykiss* ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered part of the Northern California *O. mykiss* ESU until significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Two artificially propagated stocks are considered part of the ESU (Appendix B). The Mad River steelhead hatchery is a large-scale program aimed at providing increased recreational fishing opportunities for steelhead on the northern California coast rather than augmenting naturally spawning populations. The other two propagation programs are very small ventures aimed at augmenting local steelhead abundance.

There is little historical abundance information for the Northern California *O. mykiss* ESU; however, the available data (dam counts on the Eel and Mad Rivers) indicate a dramatic decline from the abundance levels of the 1930s. The three available summer steelhead data sets exhibit recent 5-year mean abundance levels from three to 418 adults and exhibit downward short- and long-term trends. Short- and long-term abundance trends for the one current winter steelhead data series show a slightly positive trend; however, the recent 5-year mean abundance level is extremely low (32 adults). The juvenile density data for six of ten (putative) independent populations exhibit declining trends. Despite low abundance and downward trends, *O. mykiss* appears to be still widely distributed throughout this ESU. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted. In this ESU, resident fish do not substantially increase the total ESU abundance.

3.1.19 *California Central Valley O. mykiss*

The California Central Valley *O. mykiss* ESU includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries (63 FR13347; March 19, 1998).

Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the California Central Valley *O. mykiss* ESU. The ESU membership of native resident populations above recent (usually manmade) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered to be part of the California Central Valley *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Two artificial propagation programs are considered to be part of the ESU (Appendix B). Both programs are located in the Sacramento River basin and are large-scale mitigation facilities intended to support recreational fisheries for steelhead rather than to supplement naturally spawning populations.

Little information is available regarding the viability of the naturally spawning component of the California Central Valley *O. mykiss* ESU. Anadromous *O. mykiss* spawning above the Red Bluff Diversion Dam have a small population size (the most recent 5-year mean is less than 2,000 adults) and exhibit strongly negative trends in abundance and population growth rate; however, there have not been any escapement estimates made for the area above the Red Bluff Diversion Dam since the mid 1990s. The only recent ESU-level estimate of abundance is a crude extrapolation from the incidental catch of out-migrating juvenile steelhead captured in a midwater-trawl sampling program for juvenile chinook salmon below the confluence of the Sacramento and San Joaquin Rivers. The extrapolated abundance of naturally spawning female steelhead involves broad assumptions about female fecundity (number of eggs produced per female) and egg-to-smolt survival rates. Based on this extrapolation, it is estimated that on average, between 1998 and 2000, approximately 181,000 juvenile steelhead were produced naturally each year in the Central Valley by approximately 3,600 spawning female steelhead. It is estimated that there were one to two million spawners in the Central Valley prior to 1850 and approximately 40,000 spawners in the 1960s. Although it appears that *O. mykiss* remain widely distributed in Sacramento River tributaries, the vast majority of historical spawning areas are currently above impassable dams. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted.

3.1.20 *Upper Willamette River O. mykiss*

The Upper Willamette River ESU includes the Willamette River and its tributaries, upstream of Willamette Falls. The portion of the Willamette River downstream of Willamette Falls is included in the Lower Columbia River ESU. The upper river has been separated from the lower river, because NMFS has determined that the steelhead from the upper river are genetically distinct from those in the lower river. Willamette Falls is a migration barrier to certain runs of

steelhead (i.e., summer steelhead), so reproductive isolation occurs. The natural run of steelhead that occurs above the falls is winter steelhead. Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Upper Willamette River *O. mykiss* ESU. Although there are no obvious physical barriers separating populations upstream of Willamette Falls from those lower in the basin, resident *O. mykiss* in these upper basins are quite distinctive both phenotypically and genetically and are not considered part of the ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered to be part of the Upper Willamette River *O. mykiss* ESU until substantial scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

3.1.21 *Lower Columbia River O. mykiss*

The Lower Columbia River *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the Upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington. Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Lower Columbia River *O. mykiss* ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered to be part of the Lower Columbia River *O. mykiss* ESU until significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

There are five artificial propagation programs releasing hatchery steelhead that are considered to be a part of the Lower Columbia River *O. mykiss* ESU (Appendix B). All of these programs are designed to produce fish for harvest, but are also implemented to augment the natural spawning populations in the basins where the fish are released.

Some anadromous populations in the Lower Columbia River *O. mykiss* ESU, particularly summer-run steelhead populations, have shown encouraging increases in abundance in the last two to three years. Population abundance levels, however, remain small (no population has a recent 5-year mean abundance greater than 750 spawners). A number of populations have a substantial fraction of hatchery-origin spawners and are hypothesized to be sustained largely by hatchery production. Long-term trends in spawner abundance are negative for seven of nine populations for which there are sufficient data, and short-term trends are negative for five of seven populations. It is estimated that four historical populations have been extirpated or nearly

extirpated. Only half of 23 historical populations currently exhibit appreciable natural production. Although approximately 35 percent of historical habitat has been lost in this ESU due to the construction of dams or other impassible barriers, the ESU exhibits a broad spatial distribution in a variety of watersheds and habitat types.

3.1.22 *Middle Columbia River O. mykiss*

The Middle-Columbia River ESU is an inland ESU and includes the part of the Columbia River and its tributaries from Mosier Creek in Oregon upstream to (and including) the Yakima River in Washington. Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Middle Columbia River *O. mykiss* ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered part of the Middle Columbia River *O. mykiss* ESU until significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Three artificially propagated stocks are considered part of the ESU (Appendix B). All of these hatchery stocks are designed to produce fish for harvest, although two are also implemented to augment the natural spawning populations in the basins where the fish are released.

The abundance of natural populations in the Middle Columbia River *O. mykiss* ESU has increased substantially over the past five years. The Deschutes and Upper John Day rivers have recent 5-year mean abundance levels in excess of their respective interim recovery target abundance levels (NMFS 2002). Due to an uncertain proportion of out-of-ESU strays in the Deschutes River, the recent increases in this population are difficult to interpret. These interim recovery targets articulate the geometric mean of natural-origin spawners to be sustained over eight years or approximately two salmonid generations, as well as a geometric mean natural replacement rate greater than one. The Umatilla River's recent 5-year mean natural population abundance is approximately 72 percent of its interim recovery target abundance level. The natural populations in the Yakima River, Klickitat River, Touchet River, Walla Walla River, and Fifteen-mile Creek, however, remain well below their interim recovery target abundance levels. Long-term trends for 11 of 12 production areas in the ESU were negative, although it was observed that these downward trends are driven, at least in part, by a peak in returns in the middle to late 1980s, followed by relatively low escapement levels in the early 1990s. Short-term trends in the 12 production areas were mostly positive from 1990 to 2001. The number of natural returns to the Yakima River (ten percent of the interim recovery target abundance level, historically a major production center for the ESU) continued to be low. Anadromous and resident *O. mykiss*, however, remain well distributed in the majority of subbasins in the Middle Columbia River ESU. The presence of substantial numbers of out-of-basin (and largely out-of-

ESU) natural spawners in the Deschutes River raised substantial concern regarding the genetic integrity and productivity of the native Deschutes population. The extent to which this straying is an historical natural phenomenon is unknown. The cool Deschutes River temperatures may attract fish migrating in the comparatively warmer Columbia River waters, thus inducing high stray rates. Several sources indicate that resident fish are very common in the ESU and may greatly outnumber anadromous fish.

3.1.23 *Upper Columbia River O. mykiss*

The Upper Columbia River *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the United States-Canada border (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Upper Columbia River *O. mykiss* ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered to be part of the Upper Columbia River *O. mykiss* ESU until significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. Two artificially propagated stocks are considered part of the ESU (Appendix B).

The number of naturally produced fish in the Upper Columbia River *O. mykiss* ESU has increased in the last two to three years. The 1996 to 2001 average return through the Priest Rapids Dam fish ladder (just below the upper Columbia steelhead production areas) was approximately 12,900 total adults (including both hatchery and natural origin fish), compared to 7,800 adults from 1992 to 1996; however, the recent 5-year mean abundances for naturally spawned populations in this ESU are 14 to 30 percent of their interim recovery target abundance levels.

3.1.24 *Snake River Basin O. mykiss*

The Snake River Basin *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and man-made) that co-occur with anadromous populations are included in the Snake River Basin *O. mykiss* ESU. The ESU status of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are not considered to be part of the Snake River Basin *O. mykiss* ESU until significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. Recent genetic data suggest that native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater River should be considered part of this ESU. NMFS,

therefore, considers native resident *O. mykiss* populations above Dworshak Dam on the North Fork Clearwater River to be part of the Snake River Basin *O. mykiss* ESU. Hatchery rainbow trout that have been introduced to the Clearwater River and other areas within the ESU would not be considered part of the ESU.

Four artificial propagation programs produce steelhead that are considered to be part of the Snake River Basin *O. mykiss* ESU (Appendix B) in the Snake River Basin.

Scant information on adult spawning escapement for specific tributary production areas in the Snake River Basin *O. mykiss* ESU makes a quantitative assessment of viability difficult. Annual return estimates are limited to counts of the aggregate return over Lower Granite Dam and spawner estimates for the Tucannon, Grande Ronde, and Imnaha Rivers. The 2001 Snake River steelhead return over Lower Granite Dam was substantially higher relative to the low levels seen in the 1990s; the recent 5-year mean abundance (14,768 natural returns) is approximately 28 percent of the interim recovery target level. The abundance surveyed in sections of the Grande Ronde, Imnaha, and Tucannon rivers was generally improved in 2001; however, the recent 5-year abundance and productivity trends were mixed. Five of the nine available data series exhibit positive long- and short-term trends in abundance. Most long-term population growth rate estimates for the nine available series were below replacement. Most of the short-term population growth rates were marginally above replacement or well below replacement, depending upon the assumption made regarding the effectiveness of hatchery fish in contributing to natural production.

3.2 RECREATION AND COMMERCIAL FISHING

Various recreational activities occur in the action area, including fishing (subsection 1.5, Action Area). In some parts of the analysis area, recreation is an important part of community and local economic development, supported by local planning documents for parks, open space, and recreation. Recreation is also increasingly part of the mix of uses on Federal lands. For example, in a report prepared by ECONorthwest, citing a Forest Service analysis, the national forests contribute $145 billion to the national economy, three quarters ($108 billion) of which is accounted for by recreation (ECONorthwest 2001).

Recreational fishing occurs in various parts of the analysis area, varying by seasons, species, abundance, and various management regimes. Recreational salmon fisheries include ocean, inland marine, and freshwater fisheries as far inland as Idaho. The value of sport harvest fluctuates according to the allowable catch, which is dictated by the abundance of fish runs and associated local harvest regulations (Bonneville Power Administration 2001). For example, the Pacific Fishery Management Council has estimated personal income effects of ocean sport

fishing in Oregon and Washington in 1993 to be around $12.5 million annually, down from $20 million or more in the 1980s due to recent harvest restrictions to protect weak stocks of coho and chinook salmon (Bonneville Power Administration 2001). Economic value of freshwater sport fishing for anadromous fish in the early 1990s has been estimated to be about $3 million annually and has not varied by much (Bonneville Power Administration 2001).

Table 3-1 provides a summary of the value of the fishing industry as a whole in Washington, Oregon, Idaho, and California. These numbers take into account all fishing-related activities.

Table 3-1. 2000 Fishing Industry Data by State.

	Total Employment (full-time and part-time jobs)	Personal Income (thousands of $)	Wage and Salary Disbursements (thousands of $)
Washington	10,063	392,855	149,477
Oregon	3,426	4,4279	13,045
Idaho	518	3,373	1,018
California	7,104	103,386	41,843
Total	**21,111**	**$543,893**	**$205,383**

1/ Source: U.S Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, Annual State Personal Income 2001.

Catch and income from commercial fishing vary from year to year. Decreased fish abundance in the 1990s and increased production of farmed salmon have reduced the overall present value of the commercial salmon fishing industry in the analysis area.

In the state of Oregon, the Department of Fish and Wildlife issues 115,919 salmon and steelhead tags (Oregon Department of Fish and Wildlife July 2001). In 1996, anglers in Oregon spent almost $623 million in economic activity, according to statistics compiled by the American Sportfishing Association. That total applies to various types of recreational fishing, including trout, sturgeon, bass, walleye, halibut and ocean bottomfish. Salmon angling accounts for one-third of that total or more (Oregon State University 1998). According to the Washington Department of Fish and Wildlife, between January 1, 1999, and March 31, 2000, 146,706 salmon were caught in marine areas, plus an additional 92,607 salmon in freshwater (Manning and Smith 2002).

3.3 SOCIOECONOMICS

The regional economy has experienced considerable change over the last half-century, evolving from a natural resource-based economy to a more diverse economy, with growing technology and services sectors. The major rivers in the analysis area continue to provide a variety of resource uses, including transportation, electric power generation, recreation, and irrigation.

The harvest of anadromous fish has been an important activity, first for Native Americans and later for Euro-Americans. Native American, non-native commercial, and recreational anadromous fishing activities have all experienced declines in harvest levels over the last century. Salmon harvest continues to be important for several Tribes.

The economy of the analysis area consists of the following general components, which comprise gross state products (U.S. Department of Commerce, Bureau of Economic Analysis 2001):

- Agriculture, forestry, and fishing
- Mining
- Construction
- Manufacturing
- Transportation and public utilities
- Wholesale trade
- Retail trade
- Finance, insurance, and real estate
- Services and Tourism
- Government

Until a few decades ago, economic growth in the analysis area was fueled primarily by natural resource-based industries such as agriculture, fishing, mining, and forestry. Inexpensive hydropower was important in attracting energy-intensive industries such as aluminum production to the Pacific Northwest and California. Based on society's needs and values, choices were made to grow crops, raise cattle, build dams, harvest fish, build roads, and harvest timber, among other activities in this region (Lower Columbia River Estuary Program 1999). Many benefits and costs have been associated with this growth and change, some tangible and measurable, others intangible and immeasurable. Numerous communities have gained from the use and management of natural resources on Federal lands, most notably of timber harvest, mining, grazing, recreation, and irrigation activities (Lower Columbia River Estuary Program 1999). Now, growth in services, government, and technology spur a large part of the economic growth of the analysis area. Many communities are experiencing a shift in economic base. Some are experiencing a decline while others are experiencing growth (Bonneville Power Administration 2001).

To define the magnitude of the economy in the analysis area, the gross state products for all components combined are summarized in Table 3-2. Gross state product for a state is derived as the sum of gross state product originating in all industries in the state. As such, it is often

referred to as the state counterpart of the nation's gross domestic product (U.S. Department of Commerce, Bureau of Economic Analysis 2001).

Table 3-2. 1999 gross state product in current dollars (in millions of dollars).

State	GSP (Million $)
Washington	209,258
Oregon	109,694
Idaho	34,025
California	1,229,098
Total	**1,582,075**

Source: U.S. Department of Commerce, Bureau of Economic Analysis 2001.

For the nation, the real gross state product grew at an average annual rate of 4.0 percent from 1992 to 1999. Until recently, Oregon and Idaho were among the states with the fastest growth in real gross state product (6.8 percent and 6.6 percent, respectively). California accounted for the largest share of the nation's gross state product, but the rate of growth was only 3.9 percent between 1992 and 1999. This slow growth was attributed to longer-than-average recovery from the 1990-1991 recession and weakness in economic sectors such as Federal government, health services, and finance. Washington's average growth in gross state product (4.7 percent) reflected competing effects. Declines in lumber and wood products, transportation equipment, and printing and publishing sectors were offset by growth in business services, trade, and real estate (U.S. Department of Commerce, Bureau of Economic Analysis 2001).

The impacts of economic changes vary throughout the analysis area. Many rural areas are located away from a developed infrastructure, and they face serious periodic economic downturns, a diminished economic base because of resource depletion, and changes in international markets and technology (Bonneville Power Administration 2001). An example of this is the impact of the declining role of the timber industry in the overall economy on rural communities, such as Sweet Home, Oregon, which is becoming more heavily dependent on tourism and functioning as a "bedroom community" to metropolitan areas such as Salem, Oregon.

Natural resource extraction, including fishing, agriculture, forestry, and sometimes mining can be considered as a separate industry category. This industry category is generally a small percentage of the total industrial economic base for a region. For instance, in 1992 in California, the Sacramento River region's total industry output was $77.9 billion; agriculture, forestry, and fishing activities accounted for $2.6 billion of this output (approximately three percent of the total output) (CalFed Bay Delta Program 2000). This is also true if industries are categorized by

minority-owned business enterprises. The agricultural, forestry, fishing, and mining industry represented only five percent of American Indian- and Alaska Native-owned firms in 1997 (U.S. Census Bureau 2001). Fishing is less important in the economies of urban areas (i.e., Seattle, Spokane, Portland, Boise, San Francisco, and Sacramento) than in rural areas where fewer other industries may exist (National Research Council 1996).

The gross state product in millions of dollars generated by agriculture, forestry, and fishing industries in 1999 in the four states is reported in Table 3-3. The gross state product for these activities comprises two percent of the total gross state product for all four states.

Table 3-3. Gross state product generated by the agriculture, forestry, and fishing industries in 1999 (in millions of dollars).

State	GSP ($ million)	Total GSP ($ million)	Percent of Total (%)
Washington	4,355	209,258	2.1
Oregon	2,898	109,694	2.6
Idaho	1,776	34,025	5.2
California	22,779	1,229,098	1.9
Total	**$31,808**	**$1,582,075**	**2.0**

Source: U.S. Census Bureau 2001.

Non-Tribal commercial salmon fisheries include ocean troll, Puget Sound seine and gillnet, Washington coastal bays gillnet, and lower Columbia non-Indian gillnet. Most of the parties involved in these fisheries are small entities. In Washington, California, and Oregon, combined, there were 2,840 troll licenses as of 2003 (Review of 2003 Ocean Salmon Fisheries, Pacific Fishery Management Council, Tables D-6, D5, D4). In the Columbia River, there were 588 gillnet licenses as of 2000 (most recent estimate available as reported in latest issue of "Status Report Columbia River Fish Runs and Fisheries, 1938-2000, Washington Department of Fish and Wildlife and Oregon Department of Fish and Wildlife [July 2002]). In Washington, there were 1,274 purse seine and gillnet licenses and reef net licenses as of 2000 (NMFS Puget Sound Chinook Resource Harvest Management Plan, DEIS, April 2004, Tables D-A-5 and D-A-7). Not all of these licenses are actively fished. In 2003 the total number of vessels reporting landings in all ocean fisheries was 1,120 (Review of 2003 Ocean Salmon Fisheries, Pacific Fishery Management Council).

In 2003, the value of commercial landings of west coast salmon in all fisheries was $33 million (Report 307, Washington, Oregon, and California; Pacific States Marine Fisheries Commission, Pacific Fishery Information Network http://www.psmfc.org/pacfin/data/index-woc.html). Ocean troll harvest accounted for $20.3 million of that total (Review of 2003 Ocean Salmon Fisheries, Pacific Fishery Management Council, February 2004, Tables D4, D5, and D6). The average ex-vessel value of landings per troll vessel was $17,567. As noted in subsection 3.2, recreational sport fishing has an economic benefit to those who supply goods and services to the sport fishing industry, which may be as high as $600 million.

3.4 FEDERAL TREATY AND TRUST RESPONSIBILITIES

American Indians have occupied the analysis area for more than 12,000 years, but in the last two centuries traditional Tribal cultures and land uses have undergone significant displacement. The steady growth of Euroamerican populations has caused conflicts over resource use and availability, as well as pressures to change Indian cultures. The competition and conflict between native and Euroamerican people in the 1800s resulted in a treaty-making period between Tribes and the United States government through the mid to late nineteenth century.

These treaties were agreements between sovereign nations, through which the United States government recognized Tribes as political entities. In the treaties, most Tribes ceded lands in exchange for set-asides, exclusive-use reservations, services, and promises of access to traditional uses such as hunting, fishing, gathering, and livestock grazing. In exchange for cessation of Indian claims to land, the Federal government assumed trust obligations on behalf of the Tribes to protect Tribal assets and pre-existing rights allowing Indians to fish at usual and accustomed areas, and to hunt, gather, and graze livestock on open and unclaimed lands (U.S. Army Corps of Engineers 1999). In addition, presidential executive orders were signed in the late 1800s and early 1900s to reserve lands for Tribal use, identify certain services, and identify rights for non-treaty Tribes. In 1998 and 2000, former President Clinton signed Executive Orders on Tribal Consultation and Federalism. Both orders were designed to strengthen the government-to-government relationship with Indian Tribes and to ensure that all executive departments and agencies consult with Tribes as they develop policy on issues that impact Indian communities.

There have been judicial interpretations of Tribal rights and treaty language defining federal legal responsibilities. For example, a 1994 court decision involving shellfishing rights determined that treaty-reserved resources were not limited to those actually harvested at treaty time because the right to take any species, without limit, pre-existed the treaties (*United States* v. *Washington*). Congress also adopted laws and policies that protect Tribes' rights to self-determination and promote the social well-being of Tribes and their members. Therefore, under various laws and policies federal agencies have a responsibility to implement federal resource laws in a manner consistent with Tribes' abilities to protect their members, to manage their own resources, and to maintain themselves as distinct cultural and political entities.

Today's Tribal cultural, social, economic, religious, governmental interests, and treaty-reserved rights are dependent on landscape health, terrestrial source habitats, terrestrial and aquatic species, and aquatic resources. Therefore the primary focus of the federal trust responsibility continues to be the protection of such Indian-owned assets, natural resources on reservations, the treaty rights, and interests that were reserved for Tribes on off-reservation lands.

For their part, Tribal governments have broad social and natural resource responsibilities toward their memberships and often operate under different cultural and organizational intents than federal or state agencies. Tribes have interests in reservations, Indian allotments and certain off-reservation lands. However, the nature of such interests and legal rights varies. For example, some Tribes have a legal right to fish at all usual and accustomed places specified in treaties, for both on and off reservation lands, regardless of property ownership.

Some Tribes have established inter-Tribal commissions to comprehensively manage resource activities. The Northwest Indian Fisheries Commission and the Columbia River Inter-Tribal Fish Commission are involved in fisheries management, artificial propagation of salmon programs and salmon restoration plans. These Commissions provide technical assistance and disseminate information for their member Tribes. They do not, however, directly represent individual Tribal Governments.

Salmon species are also an important cultural resource in the analysis area, dating from before the earliest period of human occupation. Over 8,000 years ago, people in the general area are believed to have foraged for a wide variety of food resources located in different topographic zones, but particularly salmon. Since then salmon continue to be of cultural, economic, recreational, and symbolic importance.

Populations of salmon have been substantially depleted in the last two centuries to approximately 40 percent of their historical range. The decline in fish populations affects fishery-related cultures and their social value structures. Salmon have provided social continuity and heritage for many Americans, Native American Tribes, and non-Tribal fishing communities that depend on salmon fishing (National Research Council 1996). Sport fishers, subsistence fishers, and commercial fishers, through their knowledge of historic fishing spots, fishing stories, and ways of fishing, pass on fishing customs.

The social values of fishery-related cultures include the values of salmon for subsistence and nutritional health, their values for recreation and tourism, and their spiritual values in Native American life and ceremony. Moreover, there are important symbolic links between ethnic, community, and regional identities and salmon. Salmon are featured in art and song specifically in the Pacific Northwest to an extent shared by few other fishes anywhere (Holm 1965).

3.5 ENVIRONMENTAL JUSTICE

Executive Order 12898, signed February 11, 1994, requires each federal agency to do the following:

> . . . make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or

environmental effects of its programs, policies, and activities on minority populations and low-income populations (U.S. Environmental Protection Agency [EPA] 1998).

The presidential memorandum to all federal agencies accompanying the Executive Order established that the United States EPA, "when reviewing environmental effects of the proposed action of other Federal agencies under section 309 of the Clean Air Act, 42 U.S.C. section 7609, shall ensure that the involved agency has fully analyzed environmental effects on minority communities and low-income communities, including human health, social and economic effects." To assist other federal agencies to fully comply with this Executive Order, EPA has prepared guidance for conducting Environmental Justice analyses.

The EPA, working with the Enforcement Subcommittee of the National Environmental Justice Advisory Council has developed technical guidance for conducting environmental justice assessments, in order to achieve consistency between analyses. That 1998 guidance provides the basis for the assessment presented here.

An environmental justice analysis is intended to determine potential human health or environmental effects that could have significant and disproportionate adverse effects on low-income and/or minority populations potentially impacted by proposed federal actions. The Environmental Justice analysis should also determine whether such populations or communities have been sufficiently involved in the decision making process.

In the analysis area there are minority and low-income populations that this Executive Order could apply to, including Native American Indian Tribes, and Hispanics. Hispanic populations traditionally were found in agricultural areas drawn by jobs on farms and in food processing plants. More and more first and second generation Hispanics now live and work in urban areas, where there are increasing employment and business opportunities.

Many of the Tribes in the analysis area share the history of a culture and subsistence economy based on salmon. The decline of salmon has altered traditional Tribal economies, and reduced wealth, health, and well-being. The socioeconomic conditions for Tribal members in particular are not on par with their non-Indian neighbors (Bonneville Power Administration 2001). Low-income fishing communities have also felt the effects of the decline in salmon, though it is estimated to be to a lesser extent than effects on Native Americans (Bonneville Power Administration 2001).

3.6 WATER QUALITY

Water quality is a critical component of aquatic and riparian habitats. Many of the human activities that adversely affect water quantity also degrade water quality. Impoundments, stream

bank and channel alterations, and disturbances of natural flow regimes can all affect water quality, as can the practice of using surface waters as the recipient for municipal, industrial, and agricultural wastewaters.

Water arrives in a watershed as rain or snow. As it flows downstream, it develops certain physical and chemical characteristics that are derived from the characteristics of the watershed. These characteristics often vary daily and seasonally. Aquatic life has evolved to take advantage of the characteristics of water in rivers, streams, and lakes. Most aquatic life is adapted to a range of water quality conditions. Human activities in a watershed may alter the quality of water in rivers and streams and if quality characteristics deviate from the natural range then aquatic life may be harmed (Iwamoto *et al.* 1978; Bjornn and Reiser 1991).

The physical and chemical characteristics of water determine its suitability for different purposes. Various state and federal agencies have developed water quality criteria that define the physical and chemical characteristics of water that is suitable for a particular purpose or beneficial use. For example, criteria have been established for waters that are suitable for domestic water supply, agricultural water supply, and sustenance of aquatic life in most states (California State Water Resources Control Board 1963; U.S. EPA 1976). The most widely used water quality criteria are those published by EPA. They are updated and periodically refined, as research results become known (U.S. EPA 1986).

3.6.1 *Water Quality Regulations*

In 1972, responding to public concern about deteriorating water quality, Congress passed the Federal Water Pollution Control Amendments, later referred to as the Clean Water Act. The Clean Water Act established a nationwide strategy for abating water pollution. States were required to set ambient water quality standards that would protect the beneficial uses of the waters of the United States, including their use by fish and wildlife. Tribal Governments have independent authority for setting water quality standards and implementing regulations for waters on reservation land under the Clean Water Act.

A national permitting program was established (the National Pollutant Discharge Elimination System) to control the discharge of pollutants to the degree necessary to meet ambient water quality standards. Initially, the permitting program was focused on point sources of pollution; that is, sources which discharge pollutants at a single identifiable point, for example municipal wastewater treatment plants. In 1987, the Clean Water Act was amended to include urban storm water runoff, a diffuse or non-point source of pollutants, in the permitting program.

The Clean Water Act has been successful in that most cases of gross water pollution were eliminated within 25 years of passage of the Act. However, many more subtle water quality

problems remain, and complete compliance with ambient water quality standards has not been achieved (Patrick 1992; Natural Resources Defense Council 1993).

Periodically, states must prepare a list of waterbodies that fail to meet ambient water quality standards and submit it to the United States Environmental Protection Agency. The list is known as the 303(d) list. The states must then prepare plans to correct violations of ambient water quality standards. States must determine the reduction in discharge of pollutants necessary to enable compliance with ambient standards. The reductions in pollutant discharge are distributed amongst polluters and expressed as total maximum daily loads.

Water quality standards are in place in all states in the analysis area. But many waterbodies in the analysis area are not in compliance with all applicable ambient water quality standards analysis (Table 3-4). For example, the Columbia River in the vicinity of Longview, Washington is out of compliance for dissolved oxygen, fecal coliform, temperature, PCBs, and total dissolved gases, and the Klamath River in northern California, up to the Oregon border, is out of compliance for dissolved oxygen, nutrients, and temperature. Plans to correct the many violations of ambient standards are at an early stage in their development. Total maximum daily loads have been established for only a small proportion of the waterbodies that are not in compliance with ambient standards.

Table 3-4. Stream miles out of compliance with water quality standards.[1]

	Stream Miles Listed for Selected Parameters				Total Listed Stream Miles
	Sediment	Nutrients	Pathogens	Toxics	
Washington	18	1	393	134	546
Oregon	1,446	598	2,565	1,426	6,035
Idaho	6,228	2,653	1,539	742	11,162
California	5,823	1,119	725	6,051	13,718

[1] Represents entire state data, and is not specific to boundaries within the ESUs comprising the analysis area.
Source: Atlas of America's Polluted Waters, U.S. EPA, 2000.

3.6.2 *Water Quality Parameters*

3.6.2.1 Temperature

Water temperature influences all aspects of salmonid physiology, behavior, and ecology. Temperatures approaching or exceeding the physiologically tolerable range can cause direct mortality or acute stress in salmonids. In addition, relatively small increases in stream temperature at any time of year can adversely affect salmonids by changing metabolic requirements, behavior, rate of development of embryos and alevins, migration timing, competitive interactions, predator-prey interactions, disease-host relationships, and other important ecological functions (Monan *et al.* 1975; Bjornn and Reiser 1991; Groot 1982).

Water temperature also indirectly affects salmon survival. Foraging rates of piscivorus fish are directly related to temperature (Vigg and Burley 1991), and the rates of infectivity and mortality of several diseases are known to be directly related to temperature (NMFS 1998).

Freshwater temperature is critical for the survival of salmonids in early life stages. Embryo survival and fry emergence depend upon appropriate water temperatures (less than 57°F for most species) (Spence *et al.* 1996). Also, freshwater temperatures experienced by out-migrating juvenile salmon have been shown to affect survival (Monan *et al.* 1975; Bjornn and Reiser 1991; Groot 1982) Immigrating adults can be delayed by excessively warm water temperatures (NMFS 1998). Delay can reduce the ability of adult fish to survive to spawning, as well as vigor and fecundity during spawning (NMFS 1998).

Water temperatures exceed ambient water quality standards in many streams in the analysis area during the summer months (Washington Department of Ecology 2000). Primary causes are flow depletion as a result of diversion for irrigation and municipal water supply, impoundments, and loss of shading provided by riparian vegetation due to changes in land use such as urbanization.

3.6.2.2 Sediment

Excessive erosion caused by human activities can harm salmonids and macro-invertebrates (National Research Council 1996). Suspended sediment, or the portion of the sediment load suspended in the water column, is of particular concern for its ability to adversely impact aquatic populations (Hicks *et al.* 1991). Particulate materials can physically abrade and mechanically disrupt respiratory structures (e.g., fish gills) or surfaces (e.g., respiratory epithelia of benthic macroinvertebrates) in aquatic vertebrates and invertebrates (Rand and Petrocelli 1985). In addition, sediment loading can impact listed species of salmonids by causing local fluctuations of pool size and/or perturbations in streambed compositions (Lloyd *et a*l.1987; Hicks *et al.* 1991; Lake and Hinch 1999), and impair foraging efficiency and disrupt social behavior (National Research Council 1996). Stream sediment inputs could also have beneficial effects for salmonids, however, if coarse sediments are introduced by glacial-lacustrine deposits or high flow events causing mass wasting or slumping that increase the suitability of streambed structure for salmonids (National Research Council 1996).

3.6.2.3 Dissolved Oxygen

Dissolved oxygen refers to the concentration of oxygen dissolved in water. Adequate dissolved oxygen concentrations are important for supporting fish, invertebrates, and other aquatic life. Salmon and steelhead are particularly sensitive to reduced dissolved oxygen.

Salmonids require high levels of dissolved oxygen throughout most of their life stages with early life stages being most sensitive to reduced dissolved oxygen levels (Spence *et al.* 1996). Dissolved oxygen may be lowered in streams and rivers as a result of industrial and municipal discharges, nutrient-induced algal blooms, temperature increases, and increased siltation, which hinders exchange of water between surface and intragravel waters. Low dissolved oxygen levels influence developing eggs and alevins in a number of ways including reduced survival, retarded or abnormal development, delays in time to hatching and emergence, and reduced size of fry (Spence *et al.* 1996). In juveniles and adults, low dissolved oxygen impairs swimming performance, reduces growth, and inhibits migration (Pacific Fishery Management Council 1999; Brett 1971; Warren 1971; Moyle and Cech 1982).

All states in the analysis area have established dissolved oxygen standards designed to protect cold water fish, including salmonids. Compliance with ambient standards for dissolved oxygen is most problematic in the summer months in streams diminished by agricultural water diversions and unprotected by riparian vegetation.

3.6.2.4 Pollutants

In addition to temperature, dissolved oxygen, and sediment, salmonids can also be adversely affected by a variety of toxic pollutants (National Research Council 1996). These contaminants can enter streams as chronic inputs, such as industrial effluent or runoff from agricultural and mining areas, or as episodic inputs, such as chemical spills during transportation or failure of containment structures. Effects vary depending upon the chemicals, exposure, and interactions with other chemicals, but can range from direct mortality and behavioral or morphological abnormalities to bioaccumulation of substances in tissues, making fish unsafe for human consumption (National Research Council 1996).

4. ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This Environmental Consequences Chapter is organized according to the section headings in Chapter 2, Alternatives. The two alternatives have been analyzed for all ESUs, rather than being site-specific. Most environmental resources would not be impacted by either alternative and so were not considered in the assessment of potential broad effects. These include public health and safety, land use, geology and soils, air quality, vegetation, wildlife, archeological resources, and aesthetics. Other resources were generally analyzed by describing possible outcomes across all ESUs, and fish, recreation, socioeconomics, federal trust and treaty responsibilities to Tribal communities, environmental justice, and water quality.

4.2 ALTERNATIVE 1 (NO ACTION)

Alternative 1, the No Action alternative, would consist of all previously enacted 4(d) rules remaining in place, with no additions or amendments. In the context of the (non-discretionary) proposed listing determinations, the No Action alternative would result in the lack of take prohibitions for two ESUs currently listed as endangered but being proposed as threatened (the Upper Columbia River *O. mykiss* and Sacramento winter-run chinook ESUs). The Lower Columbia River Coho ESU, which is newly proposed for a threatened listing, similarly would not be protected by any take prohibition. The remaining ESUs currently listed as threatened would continue to be covered by the section 9(a) take prohibitions as well as the applicable limits. Under the No Action alternative the take of all listed hatchery fish and resident *O. mykiss* newly being proposed for listing would be prohibited.

4.2.1 *No Take Prohibitions for Three ESUs Proposed for Threatened Listing*

4.2.1.1 Fish (ESUs)

Under this alternative, there would be no take prohibitions for the Upper Columbia River *O. mykiss*, Sacramento winter-run chinook and Lower Columbia River Coho ESUs. These ESUs would not be protected by the section 9(a) take prohibitions or any limits thereof. These ESUs, without take prohibitions, are vulnerable to harm from a range of actions including harvest, hatchery operations, and habitat-modifying actions. If take of these fish is not prohibited, they would remain at substantial risk of further decline in abundance.

4.2.1.2 Recreation, Commercial Fishing, and Socioeconomics

There could be some positive short-term benefits to commercial and recreational fishing industries and to those communities that support these activities since the stocks would not be protected under the ESA and therefore could provide more fish for harvest. However, in the long term, salmonid populations would likely continue to severely decline in abundance, resulting in a permanent and substantial harm to the fishing industry. Impacts on localized fishing industries would include commercial losses and tourism-related losses from fishing licenses and supporting services.

Regional economic impacts would be minor as a result of salmonid population declines since natural resource extraction, including fishing, agriculture, forestry, and sometimes mining is generally a small percentage of the total industrial economic base for a region (subsection 3.3, Socioeconomics).

4.2.1.3 Federal Treaty and Trust Responsibilities

Economic impacts on Tribal communities would be the same as those on fishing-dependent communities as described above, but the decline of salmon resources would also have a substantial adverse cultural effect on various Tribes. Furthermore, it is unlikely that federal trust responsibilities to Tribes could be met once ESUs decline and fish are not available for subsistence or ceremonial harvest.

4.2.1.4 Environmental Justice

In the long term, minority and low income communities would not be disproportionately impacted under the No Action alternative relative to other communities since the adverse effect of declined salmonid resources would be equally realized by all economic sectors dependent on this resource. However, short term adverse effects could occur to low income communities centered on the fishing industry.

4.2.1.5 Water Quality

Impacts to water quality parameters, such as sediment loading and dissolved oxygen levels, could be localized, but adverse in the short-term if fishing activities were to increase and could include bank erosion for boater access, accidental oil or gas spills from fishing vessels, and general gas emissions into waterbodies from boat use. These impacts would be minimized by compliance with state water quality regulations. However, in the long term, these impacts would be minor or non-existent if the decline in salmonid populations resulted in little or no fishing activities. No changes in water temperatures are anticipated as a result of the No Action Alternative.

4.2.2 *Continued Application of Inconsistent Sets of Take Limits Applied to Threatened ESUs*

4.2.2.1 All Resources

Presently there are inconsistent sets of limits on the take prohibitions that apply to threatened ESUs. For example, for the Snake River spring/summer-run and fall-run chinook ESUs take is prohibited, and there are few applicable limits. NMFS may permit take of these listed fish, but principally only through a section 10 permit or a section 7 consultation. For these ESUs there is currently no clear mechanism for allowing fishery harvest directed at listed fish (for example, listed spring/summer-run chinook of hatchery origin in excess of broodstock and natural escapement needs). In contrast, take is prohibited for the Snake River Basin *O. mykiss* ESU, but it is covered by 13 of the 14 limits promulgated in 2000. Although NMFS may permit take through a variety of methods (e.g., through sections 7, 10, or 4(d)),the 4(d) approval process has proved to be the more efficient and flexible approach. In areas where inconsistent sets of 4(d) limits apply to threatened ESUs, harvest and hatchery managers must use different regulatory approaches when they seek take authorization. While it is possible to work within such a complex system, a more simplified system consisting of a single set of protective regulations would be less constraining, decrease public confusion, and diminish the regulatory burden associated with obtaining take authorization. For example, the 2000 4(d) limit for scientific research activities (50 CFR 223.203(b)(7)) has substantially streamlined the research permit application and review process. Where it applies consistently among ESUs in Oregon and California, it has allowed managers and researchers to generate numerous permits in the same timeframe once taken to process a few dozen permits under other methods. Further, because data for all permits are kept in a centralized location, it provides managers the ability to more readily evaluate the cumulative impact of research related activities and thereby utilize this database to assist with protections for listed fish to an even greater degree than was possible before the advent of the 2000 4(d) rule.

The No Action alternative would retain all previously adopted 4(d) rules and, therefore, the inconsistencies in limit applications. This would have no effect on the current management of the species and no environmental consequences to any resource.

4.2.3 *New Prohibition on Take of Hatchery Fish and Resident Rainbow Trout* (*O. mykiss*)

4.2.3.1 Fish (ESUs)

Under the No Action alternative, the take of hatchery fish and resident rainbow trout proposed for listing would be prohibited. The effects of this prohibition would mean that management of hatchery fish consistent with the conservation of threatened ESUs would be constrained.

Without amended 4(d) protective regulations, the hatchery fish proposed for listing would not be available for commercial, recreational, or tribal fisheries. Without harvest, naturally spawning hatchery fish would displace, compete with, or interbreed with wild fish. The adverse consequences on naturally spawned populations of hatchery fish that stray and spawn in the wild have been described in scientific literature (Brannon *et al.* 1999; ISAB 2003; IMST 2001; ISAB 2001; HSRG 2000; NRC 1995). In some locations, trapping or handling facilities allow managers to control access of hatchery-origin fish to natural spawning areas, but many natural spawning areas are not located above such facilities, and access by hatchery-origin fish is unrestricted. In addition, without adequate harvest, the number of fish returning to a given hatchery would likely exceed intended production levels and facility capacity, necessitating a restructuring of hatchery program goals and/or design at substantial financial cost, or listed hatchery fish may need to be destroyed.

4.2.3.2 Recreation, Commercial Fishing, and Socioeconomics

Prohibition of take for hatchery fish would substantially curtail recreational and commercial fishing opportunities, at least in the short term. In the short term, impacts on fishing communities and the fishing industry would likely be severe, including impacts on low income communities dependent upon the fishing industry.

Prohibiting take of rainbow trout would have substantial adverse impacts on recreational fisheries and the economic interests supported by these fisheries. It is uncertain what other environmental consequences may occur if take of rainbow trout is prohibited since there is very little information about the distribution and status of most rainbow trout (Kostow 2003).

Regional economic impacts would be minor as a result of protecting newly listed hatchery fish and rainbow trout since natural resource extraction, including fishing, agriculture, forestry, and sometimes mining is generally a small percentage of the total industrial economic base for a region (subsection 3.3, Socioeconomics).

4.2.3.3 Federal Treaty and Trust Responsibilities

The new prohibition on take of hatchery fish and resident rainbow trout (*O. mykiss)* would have a substantial adverse effect on Tribal communities that operate hatcheries and utilize hatchery-reared fish for economic and cultural benefits. In the longer term it might be possible to obtain approvals for fisheries in those ESUs that are subject to the 2000 and 2002 4(d) limits, which would likely mitigate these adverse effects over the longer term. Some Tribal governments that manage rainbow trout (*O. mykiss*) sport fisheries on their reservations may also be economically affected.

4.2.3.4 Environmental Justice

In the long term, minority and low income communities would not be disproportionately impacted under the No Action alternative relative to other communities since the adverse effect of protecting newly listed hatchery fish and rainbow trout would be equally realized by all economic sectors dependent on this resource. However, short term adverse effects could occur to low income communities centered on the fishing industry until approvals for fisheries, at least on those ESUs that are subject to the 2000 and 2002 4(d) limits, may occur, which would mitigate the adverse effects over the long term.

4.2.3.5 Water Quality

Indirect effects could include adverse water quality/dissolved oxygen impacts related to an abundance of fish carcasses in various streams. However, sediment and dissolved oxygen impacts normally associated with commercial and recreational fishing, such as bank disturbance and oil and gas emissions from vessels, would be decreased since these activities would decline. No impacts to water temperatures would be expected under the No Action alternative.

4.3 ALTERNATIVE 2 (PROPOSED ACTION)

4.3.1 *Apply 4(d) Protections and 14 Limits Promulgated in 2000 for ESUs Currently Listed as Endangered, but being Proposed for Threatened Status (the Sacramento River Winter-run Chinook and Upper Columbia River O. mykiss ESUs.*

4.3.1.1 Fish (ESUs)

Under the Proposed Action, take prohibitions would be in effect for two ESUs currently listed as endangered, but proposed for threatened status (the Upper Columbia River *O. mykiss* and Sacramento winter-run chinook ESUs). In comparison to the No Action alternative where take prohibitions for these ESUs would not be in place, NMFS could provide for the conservation of these ESUs by using the flexibility of Section 4(d) to prohibit take only to the extent needed for conservation. Unlike the No Action alternative, it is anticipated that take prohibitions under the Proposed Action would help to prevent further decline of these ESUs by preventing take of these species from activities that harm fish and fish habitat.

Furthermore, including all currently listed ESUs under a single set of limits in the 4(d) rule would make regulation of activities affecting these ESUs more consistent than under the No Action alternative.

4.3.1.2 Recreation, Commercial Fishing, and Socioeconomics

Compared to the No Action alternative, take prohibitions for these ESUs would provide more regulatory flexibility for recreation and commercial harvest activities and, therefore, increased opportunities for these activities to continue. Because salmonid populations would be expected

to improve over the long term under the Proposed Action as compared to the No Action alternative, impacts to the fishing industry would be expected to remain similar to current conditions in the short term, and to improve in the long term. Potential commercial and tourism-related losses resulting from declined salmonid populations would be minimized under the Proposed Action because of the regulatory flexibility in managing these resources, and there would likely be beneficial impacts to these industries in the long term.

As under the No Action alternative, regional economic impacts would be minor as a result of the Proposed Action since natural resource extraction, including fishing, agriculture, forestry, and sometimes mining is generally a small percentage of the total industrial economic base for a region (subsection 3.3, Socioeconomics).

4.3.1.3 Federal Treaty and Trust Responsibilities

Under the Proposed Action, economic impacts on Tribal communities would be similar to those on fishing-dependent communities as described above. Unlike the No Action alternative, the conservation of these ESUs with regulatory flexibility would be a beneficial impact on Tribes dependent on these salmonid resources for economic and cultural benefits because there would likely be more opportunities for Tribal fisheries activities to occur and with more regulatory certainty. Federal trust responsibilities to Tribes would be more certain under the Proposed Action than under the No Action alternative because of more flexible resource management options available to Tribes.

4.3.1.4 Environmental Justice

As under the No Action alternative, minority and low income communities would not be disproportionately impacted under the Proposed Action relative to other communities since the effects from conservation management of these ESUs would be equally realized by all economic sectors dependent on this resource. However, low income communities centered on the fishing industry may realize beneficial effects resulting from regulatory flexibility of commercial and recreational harvesting as compared to the No Action alternative.

4.3.1.5 Water Quality

Unlike the No Action alternative where short term adverse water quality impacts would increase due to lack of take prohibitions, short term adverse water quality impacts resulting from fishing activities would be minimized due to regulatory constraints on the fishing industry under the Proposed Action. Impacts on water quality parameters, such as sediment loading and dissolved oxygen levels, could be localized, but less than the level of impact expected under the No Action alternative if fishing were unregulated. Impacts could include bank erosion for boater access,

accidental oil or gas spills from fishing vessels, and general gas emissions into water bodies from boat use.

In the long term, there could be greater impacts on water quality under the Proposed Action than under the No Action if salmonid populations improve. Fishing activities would continue for a longer period under the Proposed Action than would likely occur under the No Action scenario if populations continued to decline. However, it is not anticipated that these impacts would be substantial since fishing would be regulated and controlled by the limit criteria and state water quality regulations.

Like the No Action alternative, there would be no changes to water temperatures as a result of the Proposed Action.

4.3.2 *Apply 4(d) Protections to One ESU Newly Proposed to be Listed as Threatened (Lower Columbia River Coho ESU) with the Same Set of 14 Limits Promulgated in 2000*

4.3.2.1 Fish (ESUs)

The effect of applying amended 4(d) protective regulations to the Lower Columbia River coho ESU, as part of the Proposed Action alternative, would be to increase regulation by prohibiting take of natural fish that would not be protected by NMFS under the No Action alternative. However, this increase would likely be minor as Lower Columbia coho salmon are currently regulated by the State of Oregon, which has listed them under the state's endangered species act. Furthermore, Lower Columbia coho occur in streams already protected due to the presence of listed chum, chinook, and steelhead ESUs. Naturally spawned Lower Columbia River coho would benefit from the take prohibitions and regulatory flexibility provided by the amended 4(d) protective regulations under the Proposed Action alternative. Hatchery fish make up the vast majority of returning natural spawners in this ESU. The Proposed Action alternative, by not applying the take prohibitions to ESU hatchery fish, maintains the ability of NMFS and co-managers to effectively manage and minimize potential adverse impacts of abundant returns of hatchery fish, consistent with the conservation needs of the ESU.

4.3.2.2 Recreation, Commercial Fishing, and Socioeconomics

Currently, the hatchery programs within the Lower Columbia ESU produce large numbers of 100 percent adipose-fin-clipped fish intended to provide substantial harvest opportunities. Under the No Action alternative, no take prohibitions would apply to ESU hatchery fish, resulting in minimal impacts to recreational, commercial, and tribal harvest opportunities. Similarly, impacts under the Proposed Action alternative would be minor, as take prohibitions would not apply to ESU hatchery fish.

4.3.2.3 Federal Treaty and Trust Responsibilities

The historical boundary of the Lower Columbia River Coho ESU includes some tributaries above Bonneville Dam (which is the downstream boundary of the Columbia River treaty tribes' current-day fisheries, but not necessarily the boundary of their historical usual and accustomed fishing area). Though the indigenous coho have been largely (if not entirely) extirpated from these streams, prohibiting take of listed Lower Columbia River Coho could affect Tribal recovery and reintroduction efforts and ultimately Tribal fisheries. In addition, in recent years hatchery fish from this ESU have been released above Bonneville Dam with and without adipose fin clips. NMFS anticipates that applying the take limit for Tribal resource management plans to this ESU would allow the Federal agency to accommodate Tribal efforts to reintroduce coho to historical areas.

4.3.2.4 Environmental Justice

Under both the No Action and Proposed Action alternatives, minority and low income communities would not be disproportionately impacted relative to other communities. Any minor effects from conservation management of this ESU would be equally realized by all economic sectors dependent on this resource. Moreover, since the take of within-ESU hatchery fish would not be prohibited under either alternative, low income communities dependent on this resource would not experience appreciable economic impacts under either approach.

4.3.2.5 Water Quality

Impacts to water quality parameters such as sediment loading and dissolved oxygen could be greater under the Proposed Action than under the No Action alternative because take of hatchery fish would not be prohibited from activities such as fishing. Impacts could include bank erosion for boater access, accidental oil or gas spills from fishing vessels, and general gas emissions into water bodies from boat use. However, it is not anticipated that these impacts would be substantial since fishing would be regulated and controlled through the limit criteria and state water quality regulations.

Like the No Action alternative, there would be no changes to water temperatures as a result of the Proposed Action.

4.3.3 *Apply the Same Set of Limits to all Threatened ESUs by Bringing the Snake River Fall-run Chinook, Snake River Spring/Summer-run Chinook, Southern Oregon/Northern California Coast Coho, Central Valley Spring-run Chinook, California Coastal Chinook, and Northern California O. mykiss ESUs under the 13 Limits Promulgated in 2000*

4.3.3.1 All Resources

Unlike the No Action alternative, fishery managers could utilize a single efficient regulatory system if all 14 limits were applied consistently to all ESUs. While this change would result in efficiencies for managers, it is unlikely to have an impact on the affected resources. Activities permitted under the No Action alternative would be permitted under the Proposed Action, but through a more efficient process. No environmental consequences would occur to any resource under the Proposed Action.

4.3.4 *Amend the Expired 4(d) Limit to Allow Take for Ongoing Research for a Limited Period (§223.203(b)(2).*

4.3.4.1 All Resources

There would be no resource impact under the No Action alternative if this limit were not removed from the 4(d) rule since it has expired and has no on-the-ground effect. Similarly, there would be no effect to any resource by the Proposed Action alternative since it would provide an exemption for research activities with pending permit applications that would be permitted by other regulatory options (e.g., section 7, 10, or other 4(d) limits) under the No Action alternative.

4.3.5 *Move the Description of the Limit for Tribal Resource Management Plans (§223.209) so that the Text would Appear next to the 4(d) Rule in the Code of Federal Regulations, Improving the Clarity of the 4(d) Regulations*

4.3.5.1 All Resources

There would be no effect on any resource by this administrative action since the limit would not be changed in any way. Similarly, there would be no resource impact under the No Action alternative if the text for this limit were not moved since the limit would remain in effect regardless of its descriptive location within the rule.

4.3.6 *Amend the Current 4(d) Rule so that Take is Prohibited Only for Anadromous Fish with an Intact Adipose Fin (that is, take prohibitions apply only to the extent necessary and advisable for the conservation of the listed species).*

4.3.6.1 Fish (ESUs)

Under the Proposed Action alternative, the regulatory effect of not applying the Section 9(a) take prohibitions to adipose-fin-clipped hatchery fish and resident *O. mykiss* is that take would be allowed. Allowing take of clipped hatchery fish would provide necessary management flexibility to control the number and proportion of hatchery fish spawning in the wild, which would reduce the adverse impacts of hatchery fish on natural populations expected under the No Action alternative (subsection 4.1.1.3, No Action, New Prohibitions on Take of Hatchery Fish). Potential adverse consequences of applying take prohibitions to clipped hatchery fish under the No Action alternative include competition, disease transmission, and genetic introgression with

natural populations (NWPCC 2003; ISAB 2003; IMST 2001; ISAB 2001; HSRG 2000; NRC 1995).

Allowing take of resident rainbow trout under the Proposed Action alternative would have unknown biological effects. At this time, NMFS does not have sufficient information to determine that the take of resident rainbow trout is "necessary and advisable for the conservation" of the ESUs proposed for listing (NWPCC 2003). Little or no population data are available for most resident *O. mykiss* populations, greatly complicating assessments of the contribution of resident fish to ESU viability, as well as evaluations of the necessary and advisable protections for conserving *O. mykiss* ESUs. Where available, NMFS has incorporated information about resident populations into extinction risk analyses (NMFS 2003b; 69 FR 33102; June 14, 2004), and NMFS has noted that the presence of relatively numerous resident populations can reduces risk to ESU abundance. However, there is considerable scientific uncertainty as to how the resident form affects extinction risk through its influence on ESU productivity, spatial structure, and diversity. Despite the reduced risk to abundance for certain *O. mykiss* ESUs due to numerically abundant residents, the collective contribution of the resident life-history form to the viability of an ESU in-total is unknown (NMFS 2004a), as is the value of extending take prohibitions to resident fish. Based on present scientific understanding, there is insufficient information to evaluate the contribution of resident fish to ESU viability, or to determine whether extending protections to rainbow trout would contribute to the conservation and recovery of *O. mykiss* ESUs.

4.3.6.2 Recreation, Commercial Fishing, and Socioeconomics

Compared to the No Action alternative, the Proposed Action would provide substantial beneficial effects on commercial and recreational harvest industries and the communities dependent on these resources. Unlike the No Action alternative, which would severely limit the availability of hatchery-reared fish for commercial use, the Proposed Action would continue to allow these activities by providing regulatory mechanisms for this take.

Allowing take of rainbow trout would have a continued beneficial impact on recreational fisheries and the economic interests supported by these fisheries as compared to any adverse effects expected under the No Action alternative. It is uncertain what other environmental consequences may occur if take of rainbow trout is allowed since there is very little information about the distribution and status of most rainbow trout (Kostow 2003).

Regional economic impacts would be minor as a result of allowing take of hatchery fish since natural extractions, including fishing, is generally a small percentage of the total industrial economic base for a region (subsection 3.3, Socioeconomics).

4.3.6.3 Federal Treaty and Trust Responsibilities

Effects on Tribal communities that operate hatcheries and utilize hatchery-reared fish for economic and cultural purposes would be substantially beneficial under the Proposed Action compared to conditions under the No Action alternative since take of hatchery fish would be allowed. While it may be possible for Tribes to obtain approvals for fisheries in those ESUs subject to the 2000 and 2002 4(d) limits under the No Action alternative, the Proposed Action would eliminate the need for additional process steps by the Tribes when managing hatchery fish from their programs.

4.3.6.4 Environmental Justice

Minority and low income communities would not be disproportionately impacted under the Proposed Action alternative relative to other communities since the beneficial effect of allowing take of hatchery fish would be equally realized by all economic sectors dependent on this resource. However, unlike conditions under the No Action alternative, low income communities centered on the fishing industry would substantially benefit from allowable take of hatchery fish under the Proposed Action since more fish would be available for economic benefit.

4.3.6.5 Water Quality

Allowing take of hatchery fish under the Proposed Action would prevent adverse dissolved oxygen impacts related to an abundance of fish carcasses in various streams expected under the No Action alternative from unharvested fish returning to hatcheries.

Increased sediment loading could occur under the Proposed Action as compared to the No Action alternative because take of hatchery fish would not be prohibited from activities such as fishing. Impacts could include bank erosion for boater access, accidental oil or gas spills from fishing vessels, and general gas emissions into water bodies from boat use. However, it is not anticipated that these impacts would be substantial since fishing would be regulated and controlled through state water quality regulations.

As under the No Action alternative, there would be no changes to water temperatures as a result of the Proposed Action.

4.4 CUMULATIVE EFFECTS

Other federal, Tribal, and state actions are expected to occur that would affect the fish populations within the 23 ESUs considered under the Proposed Action alternative. State and

Tribal fisheries occur in the Washington, Oregon, Idaho, and California ESUs. Land management and water use decisions that affect these populations are made in each of these areas. There are overarching concerns and legal mandates for the recovery of listed salmonid populations in the ESUs; at the same time there are social and cultural needs for sustainable fisheries and sustainable economic use of resources.

There are numerous initiatives by state, federal, Tribal, and private entities designed to restore threatened salmonid populations. Federal actions for salmon recovery are currently underway in many of the ESUs. These actions include development of sub-basin plans in support of regional planning and recovery efforts. State initiatives include recently passed legislative measures to facilitate the recovery of listed species and their habitats, as well as the overall health of watersheds and ecosystems. Regional programs are being developed that designate priority watersheds and facilitate development of watershed management plans. Tribes have also developed restoration plans for anadromous fish, for example the Wy-Kan-Ush-Mi Wa-Kish-Wit or Spirit of the Salmon plan in the Columbia River Basin. All of these regional efforts are expected to help increase salmonid populations in the ESUs because of compatible goals and objectives.

The cumulative impacts of NMFS' current Proposed Action are expected to be minor because of reporting and monitoring requirements that would ensure compatibility with other conservation strategies. Within the ESUs, there are expected to be beneficial effects on the biological and human environments associated with the application of scientific fishery management to provide for sustainable benefits. Conservative management is only one element of a large suite of regulations and environmental factors that may influence the overall health of listed salmon populations and their habitat. Monitoring and adaptive management would help ensure that affected ESUs are adequately protected and would help counter-balance any potential adverse cumulative impacts.

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APPENDIX A

DESCRIPTION OF NMFS' 2000 4(d) LIMITS

A.1 ESA SECTION 10 ACTIVITIES

This limit recognizes that those holding permits under section 10 of the ESA (or receiving other exemptions under the ESA) are free of the take prohibitions so long as they act in accordance with the permit or applicable law. Land management activities associated with a habitat conservation plan and scientific research are examples of activities for which a section 10 permit may be issued (NMFS 2000h).

A.2 ONGOING SCIENTIFIC RESEARCH

The final 2000 4(d) rule does not restrict ongoing scientific research that affects threatened ESUs for up to 8 months (i.e., through February 2001), provided an application for a research or enhancement permit reaches the Assistant Administrator for Fisheries, NOAA, within 90 days after the rule is published. The take prohibitions will extend to these activities if the Assistant Administrator rejects an application as insufficient, if a permit is denied, or if six months have elapsed since the effective date of the final rule, whichever occurs earliest. It is in the interest of conservation not to disrupt ongoing research and conservation projects, some of which are of long duration. This limit on the take prohibitions ensures there will be no unnecessary disruption of those activities, yet provides NMFS with the ability to halt the activity if it will have unacceptable impacts on a listed ESU. This limit promulgated in 2000 has expired, and under the Proposed Action, NMFS proposes to amend it to exempt ongoing scientific research for up to 8 months (from publication of the final rule), provided an application reaches the Assistant Administrator for NOAA Fisheries within 90 days from publication of the final rule. Under the No Action alternative, this limit would remain expired, but would still appear in the rule.

A.3 RESCUE AND SALVAGE ACTIONS

This limit relieves certain agency and official personnel (or their designees) from the take prohibitions when they are acting to aid an injured or stranded fish or salvage a dead fish for scientific study. Each agency acting under this limit is to report the numbers of fish handled and their status on an annual basis. This limit on the take prohibitions conserves the listed species by preserving life or furthering an understanding of species' biology

A.4 FISHERY MANAGEMENT

State fishery management programs that are specifically implemented to minimize impacts of recreational fisheries on listed species can be developed into fishery management and evaluation plans (FMEPs). FMEPs must include measures to minimize and adequately limit take of

threatened salmonids, such as allowing only marked fish of hatchery origin to be retained, permitting open fishing seasons only where and when hatchery fish dominate, providing sanctuary areas for naturally spawning salmonids, and regulating timing of other fisheries to minimize incidental take of juvenile salmonids. The FMEPs must also include monitoring of take of threatened salmonids, annual coordination with NMFS on the fishing regulations, and providing NMFS with access to all data and reports related to the program. NMFS believes that a fishery program with these characteristics will adequately protect threatened salmonids. Once NMFS deems that a Fishery Management and Evaluation Plan (FMEP) is protective of salmonids, NMFS provides a concurrence letter, specifying any monitoring and reporting requirements. Before finding any new or amended FMEP adequate, NMFS makes the plan available for public review and comment for a period of not less than 30 days.

A.5 ARTIFICIAL PROPAGATION

Hatchery salmonids are produced for conservation and harvest purposes, including recreational and Tribal fisheries, usually as mitigation for lost spawning habitat upstream of impassable dams. For its salmonid artificial production programs to be free of take prohibitions, a state must develop a hatchery and genetic management plan (HGMP) and ensure adequate implementation of the activities described in the plan.

To ensure that broodstock collection and associated production are appropriate, NMFS has developed criteria for evaluating HGMPs. These criteria include strict limits on collecting broodstock based on whether the population functions at or above a viable population threshold. When a population is not function at or above this threshold, collection would be appropriate only if the intended goal of the collection program is strictly to enhance the propagation or survival of the listed ESU. Broodstock collection may also be appropriate in limited circumstances where the donor population is well above critical thresholds, although not yet viable, and collection will not appreciably slow the attainment of viable status.

An HGMP also must appropriately prioritize broodstock collection programs, demonstrate adequate existing fishery management programs and regulations, demonstrate adequate hatchery facilities, contain effective monitoring efforts, and include specific hatchery practice protocols aimed at conserving the genetic integrity of listed, naturally spawning salmonids.

A.6 JOINT TRIBAL/STATE PLANS DEVELOPED UNDER THE *UNITED STATES* V. *WASHINGTON* OR THE *UNITED STATES* V. *OREGON* SETTLEMENT PROCESSES

Non-Tribal salmonid management in the Puget Sound and Columbia River areas is profoundly influenced by the fishing rights of numerous Indian tribes and must be responsive to the court

proceedings that interpret and define those Tribal rights. Various orders of the *United States* v. *Washington* court, such as the Puget Sound Salmon Management Plan (originally approved by the court in 1977; amended in *United States* v. *Washington*, 626 F. Supp. 1405, 1527 (1985, W.D. Wash.)), mandate that many aspects of fishery management, including but not limited to harvest and artificial production actions, be jointly coordinated by the State of Washington and the Western Washington Treaty tribes. The State of Washington, affected tribes, other interests, and federal agencies are all working toward an integrated set of management strategies and strictures that respond to the biological, legal, and practical realities of salmon management in Puget Sound. Similar principles apply in the Columbia River basin where the States of Oregon, Washington, and Idaho and five treaty tribes work within the framework and jurisdiction of *United States* v. *Oregon*.

NMFS includes this limit on the take prohibitions to accommodate any resource management plan developed jointly by the States and the Tribes (joint plan) under the jurisdiction of *United States* v. *Washington* or *United States* v. *Oregon* for fishery management or artificial propagation activities. Such a plan would be developed and reviewed under the government-to-government processes outlined in the final 4(d) rule for Tribal Resource Management Plans, and analyzed using the criteria of limit 4 or 5, as appropriate. Before any joint plan receives a limit on the take prohibitions, the Secretary must determine that it will not appreciably reduce the likelihood of the listed species' survival and recovery. The Secretary shall publish a notice in the *Federal Register* of any pending determination regarding a joint plan; the notice will include a discussion of the biological analysis underlying the determination, and invite public input on the advisability and adequacy of the Secretary's pending determination.

NMFS will evaluate joint plans on a regular basis to determine if they sufficiently protect and conserve the listed fish.

A.7 SCIENTIFIC RESEARCH

In carrying out their fishery management responsibilities, state fishery management agencies conduct or permit a wide range of scientific research and monitoring studies on various fisheries, including studies on threatened salmonids. In general, NMFS concluded that these activities are vital for improving the understanding of the status and risks facing threatened salmonids, and will provide critical information for assessing the effectiveness of current and future management practices. NMFS, therefore, does not find it necessary and advisable to prohibit take of threatened salmonids for scientific research and monitoring purposes, provided that: (1) research and monitoring involving directed take of threatened salmonids is conducted or supervised by personnel attached to the appropriate state agencies; (2) the agencies provide NMFS with a list of all research and monitoring activities involving threatened salmonids

directed take planned for the coming year for NMFS' review and approval; (3) the agencies provide NMFS with the results of research and monitoring studies (including a report of the directed take resulting from these studies) directed at threatened salmonids; (4) the agencies provide NMFS annually with a list of all research and monitoring studies they permit that may incidentally take threatened salmonids during the coming year, and report the level of incidental take from the previous year's research and monitoring activities for NMFS' review and approval; and (5) research and monitoring activities involving electrofishing in any body of water known to or suspected to contain threatened salmonids should comply with "Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act" (NMFS 1998), or else requires a section 10 research permit from NMFS prior to commencing operations.

A.8 HABITAT RESTORATION LIMITS ON THE TAKE PROHIBITIONS

Certain habitat restoration activities that are likely to contribute to conserving threatened salmonids are not subject to the take prohibitions. NMFS finds that projects based on a watershed or basin scale are likely to be the most beneficial at conserving threatened salmonids. Incidental take of threatened salmonids that results from a habitat restoration activity would not be prohibited provided that state agencies have certified in writing that the activity is part of a watershed conservation plan consistent with the watershed plan guidelines that NMFS has approved, and NMFS concurs. Until a watershed conservation plan is implemented or until two years following the effective date of a final 4(d) rule (whichever comes first), incidental take resulting from six specified categories of habitat restoration activity would not be prohibited if conducted in compliance with conditions and guidance listed in the rule. If no conservation plan has been approved for a watershed after two years following the effective date of the interim rule, the general take prohibitions applicable to all other habitat-affecting activities would apply to individual restoration activities.

A.9 WATER DIVERSION SCREENING

A widely recognized cause of mortality among anadromous fish is operation of water diversions without adequate screening. While state laws and federal programs have long recognized these problems and encouraged or required adequate screening of diversion ditches, structures, and pumps, large numbers of diversions are not adequately screened and remain a threat, particularly to juvenile salmonids. NMFS limits the application of take prohibitions for any diversion screened in accordance with NMFS Juvenile Fish Screening Criteria, Northwest Region, revised February 16, 1995, with a May 9, 1996, Addendum. The limitation on take prohibitions applies

only to physical impacts on listed fish due to entrainment or similar impacts of the act of diverting.

A.10 ROUTINE ROAD MAINTENANCE

The Oregon Department of Transportation (ODOT), working with NMFS, has refined its routine road maintenance program to protect listed salmonids and their habitat and to minimize the impacts of road maintenance activities on receiving streams. The program governs a wide variety of maintenance activities, including surface and shoulder work; ditch, bridge, and culvert maintenance; snow and ice removal; emergency maintenance; and mowing, brush control, and other vegetation management. The program directs activity toward favorable weather conditions, increases attention to erosion control, prescribes appropriate equipment use, governs disposal of vegetation or sediment removed from roadsides or ditches, and includes other improved protections for listed salmonids, as well as improving habitat conditions. NMFS does not find it necessary and advisable to apply take prohibitions to routine road maintenance work performed consistent with the ODOT's *Maintenance of Water Quality and Habitat Guide* (Guide) (1999), because NMFS believes that doing so would not increase the level of protection provided for threatened salmonids. The Guide governs only routine maintenance activities of ODOT staff. Other activities, including new construction, major replacements, or activity for which a COE permit is required, are not covered by the routine maintenance program and, therefore, would remain subject to the take prohibitions. NMFS limits the application of take prohibitions for any incidental take of threatened salmonids that results from road maintenance activities (other than pesticide spraying and dust abatement), so long as the activity is covered by and conducted in accordance with the Guide.

A.11 PORTLAND PARKS INTEGRATED PEST MANAGEMENT

The city of Portland, Oregon, Parks and Recreation has been operating and refining an integrated pest management program for several years, with a goal of reducing the extent of its use of herbicides and pesticides in park maintenance. The program's decision tree places the first priority on prevention of pests (weeds, insects, disease) through policy, planning, and avoidance measures (design and plant selection). The second priority is on cultural and mechanical practices, trapping, and biological controls. Use of biological products is considered the third priority, and use of chemical products is to be considered the last priority. Portland, Oregon, Parks and Recreations overall program affects only a small proportion of the land base and waterways within Portland, and it serves to minimize any impacts on listed salmonids from chemical applications associated with that specific, limited land base. NMFS believes it would contribute to conservation of listed salmonids if jurisdictions would broadly adopt a similar

approach to eliminating and limiting chemical use in their parks and in other governmental functions. Portland, Oregon, Parks and Recreation has developed special policies to provide extra protections near waterways and wetlands, including a 25-foot buffer zone in which pesticide types are limited, and application is spot-applied. After careful analysis of Portland, Oregon, Parks and Recreation's integrated program for pest management, NMFS concluded that it provides adequate protection for threatened salmonids with respect to the program's limited use of the listed chemicals. NMFS does not find it necessary and advisable to apply additional federal protections in the form of take prohibitions to activities conducted under Portland, Oregon, Parks and Recreation's integrated pest management program.

A.12 MUNICIPAL, RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL DEVELOPMENT AND REDEVELOPMENT

As a general matter, significant new economic development has the potential to degrade threatened salmonid habitat and to injure or kill salmonids through a variety of impacts. Appropriate safeguards can be specifically tailored to minimize impacts on threatened salmonids to an extent that makes additional federal protections unnecessary for conservation of the listed ESU. NMFS proposes not to apply take prohibitions to planning efforts, ordinances, regulations, and programs (promulgated by city, county, and regional governments) that conserve listed salmon and steelhead by regulating or otherwise limiting activities associated with Municipal, Residential, Commercial, and Industrial development. Similarly, take prohibitions would not be applied to development consistent with an Urban Reserve Plan that Metro has evaluated and approved as in compliance with adequate guidelines. Guidelines or ordinances must ensure that urban reserve plans or developments will adequately address 12 issues, including appropriate siting, storm water discharge impacts to water quality, quantity, and hydrograph characteristics, riparian buffers, avoidance of stream crossings by roads wherever possible, protecting historic stream meander patterns and wetlands, preserving flood capacity, and erosion control. Where NMFS finds ordinances or Metro guidelines adequate, imposition of take prohibitions is not necessary or advisable.

A.13 FOREST MANAGEMENT IN WASHINGTON

In the state of Washington, discussions among the timber industry, Tribes, state and federal agencies, and interest groups led to a February 22, 1999, Forest and Fish Report (FFR) presented to Governor Locke. The report provides important improvements in forest practice regulation. If implemented by the Washington Forest Practices Board in a form at least as protective as that laid out in the FFR, these improvements will provide an enhanced level of protection to listed salmonid species. The FFR also mandates that all existing forest roads be inventoried for

potential impacts on salmonids through culvert inadequacies, erosion, slope failures, and the like, and all needed improvements be completed within 15 years. Because of the substantial detrimental impacts of inadequately sited, constructed, or maintained forest roads on salmonid habitat, this feature of the overall FFR provides an important conservation benefit for listed ESUs in Washington. NMFS does not propose to apply take prohibitions to non-federal forest management activity conducted in the state of Washington that is in compliance with the FFR.

A. 14. TRIBAL RESOURCE MANAGEMENT PLANS

The United States has a unique legal relationship with Indian tribes as set forth in the Constitution of the United States, treaties, statutes, executive orders, and court decisions. The appropriate exercise of its trust obligation commits the United States to harmonize its many statutory responsibilities with the tribal exercise of tribal sovereignty, tribal rights, and tribal self-determination. With respect to the above described limits, NMFS determined it is not necessary and advisable to apply the section 9 take prohibitions to specified categories of activities that contribute to conserving listed salmonids or are governed by a program that adequately limits impacts on listed salmonids. Similarly, NMFS determined it is not necessary or advisable to prohibit activities associated with Tribal resource management activities when those activities conserve listed salmonids or adequately limit impacts on listed salmonids. Under this limit, a tribe could conduct tribal trust resource management actions that may take threatened salmonids, without the risk of violating take prohibitions adopted under ESA section 4(d). Eligibility for this limit requires a determination by the Secretary that implementing a specific Tribal Plan will not appreciably reduce the likelihood of survival and recovery of the listed species. This limit on take prohibitions would encompass a variety of types of Tribal Plans, including but not limited to, plans that address fishery harvest, artificial propagation, research, or water or land management. Tribal Plans could be developed by one tribe or jointly with other tribes. Where there exists a Federal court proceeding with continuing jurisdiction over the subject matter of a Tribal Plan, the plan may be developed and implemented within the ongoing Federal court proceeding.

APPENDIX B

LIST OF ARTIFICIAL PROPAGATION PROGRAMS INCLUDED IN EVOLUTIONARILY SIGNIFICANT UNITS (ESUS) OF WEST COAST SALMON AND *ONCORHYNCHUS MYKISS*

APPENDIX B

List of artificial propagation programs included in ESU of West Coast salmon and *O. mykiss*.

Evolutionarily Significant Unit (ESU)	Artificial Propagation Program	Run	Location (State)
Ozette Lake Sockeye ESU	Umbrella Creek Hatchery – Makah Tribe	N/A	Ozette Lake (Washington)
	Big River Hatchery – Makah Tribe	N/A	Ozette Lake (Washington)
Central Valley spring-run chinook ESU	N/A		
Sacramento River winter-run chinook ESU	Livingston Stone National Fish Hatchery (NFH) Conservation Program	Winter	Sacramento River (California)
	Captive Broodstock Program	Winter	Livingston Stone NFH & Univ. of Calif. Bodega Marine Laboratory (California)
California Coastal chinook ESU	Freshwater Creek/Humboldt Fish Action Council	Fall	Freshwater Creek, Humboldt Bay (California)
	Yager Creek Hatchery	Fall	Yager Creek, Van Duzen River (California)
	Redwood Creek Hatchery	Fall	Redwood Creek, South Fork Eel River (California)
	Hollow Tree Creek Hatchery	Fall	Eel River (California)
	Mattole Salmon Group Hatchery	Fall	Squaw Creek, Mattole River (California)
	Van Arsdale Fish Station	Fall	Eel River (California)
	Mad River Hatchery	Fall	Mad River (California)
Upper Willamette River chinook ESU	McKenzie River Hatchery (ODFW stock #24)	Spring	McKenzie River (Oregon)
	Marion Forks Hatchery (ODFW stock #21)	Spring	North Fork Santiam River (Oregon)
	South Santiam Hatchery (ODFW stock #23)	Spring	South Fork Santiam River (Oregon)
		Spring	Calapooia River (Oregon)
		Spring	Mollala River (Oregon)
	Willamette Hatchery (ODFW stock #22)	Spring	Middle Fork Willamette River (Oregon)
	Clackamas Hatchery (ODFW stock # 19)	Spring	Clackamas River (Oregon)
Lower Columbia River chinook ESU	Sea Resources Tule chinook Program	Fall	Chinook River (Washington)
	Big Creek Tule chinook Program	Fall	Big Creek (Oregon)
	Astoria High School (STEP) Tule chinook Program	Fall	Big Creek (Oregon)
	Warrenton High School (STEP) Tule chinook Program	Fall	Big Creek (Oregon)

Evolutionarily Significant Unit (ESU)	Artificial Propagation Program	Run	Location (State)
Lower Columbia River chinook ESU (continued)	Elochoman River Tule chinook Program	Fall	Elochoman River (Washington)
	Cowlitz Tule chinook Program	Fall	Lower Cowlitz River (Washington)
	North Fork Toutle Tule chinook Program	Fall	Cowlitz River (Washington)
	Kalama Tule chinook Program	Fall	Kalama River (Washington)
	Washougal River Tule chinook Program	Fall	Washougal River (Washington)
	Spring Creek NFH Tule chinook Program	Fall	Upper Columbia River Gorge (Washington)
	Cowlitz spring chinook Program	Spring	Upper Cowlitz River (Washington)
		Spring	Cispus River (Washington)
	Friends of Cowlitz spring chinook Program	Spring	Upper Cowlitz River (Washington)
	Kalama River spring chinook Program	Spring	Kalama River (Washington)
	Lewis River spring chinook Program	Spring	Lewis River (Washington)
	Fish First spring chinook Program	Spring	Lewis River (Washington)
	Sandy River Hatchery (ODFW stock #11)	Spring	Sandy River (Oregon)
Puget Sound chinook ESU	Kendall Creek Hatchery	Spring	North Fork Nooksack River (Washington)
	Marblemount Hatchery	Fall	Lower Skagit River (Washington)
		Spring (yearlings)	Upper Skagit River (Washington)
		Spring (sub-yearlings)	Upper Skagit River (Washington)
		Summer	Upper Skagit River (Washington)
	Harvey Creek Hatchery	Summer	North Fork Stillaguamish River (Washington)
	Whitehorse Springs Pond	Summer	North Fork Stillaguamish River (Washington)
	Wallace River Hatchery	Summer (yearlings)	Skykomish River (Washington)
		Summer (sub-yearlings)	Skykomish River (Washington)
	Tulalip Bay (Bernie Kai-Kai Gobin Hatchery/Tulalip Hatchery)	Summer	Skykomish River/Tulalip Bay (Washington)
Puget Sound chinook ESU (continued)	Soos Creek Hatchery	Fall	Green River (Washington)
	Icy Creek Hatchery	Fall	Green River (Washington)

Evolutionarily Significant Unit (ESU)	Artificial Propagation Program	Run	Location (State)
	Keta Creek – Muckelshoot Tribe	Fall	Green River (Washington)
	White River Hatchery	Spring	White River (Washington)
	White Acclimation Pond	Spring	White River (Washington)
	Hupp Springs Hatchery	Spring	White River (Washington)
	Voights Creek Hatchery	Fall	Puyallup River (Washington)
	Diru Creek	Fall	Puyallup River (Washington)
	Clear Creek	Fall	Nisqually River (Washington)
	Kalama Creek	Fall	Nisqually River (Washington)
	Dungeness/Hurd Creek Hatchery	Spring	Dungeness River (Washington)
	Elwha Channel Hatchery	Fall	Elwha River (Washington)
Snake River fall-run chinook ESU	Lyons Ferry Hatchery	Fall	Snake River (Idaho)
	Fall chinook Acclimation Ponds Program – Pittsburg, Captain John, and Big Canyon ponds	Fall	Snake River (Idaho)
	Nez Perce Tribal Hatchery – including North Lapwai Valley, Lakes Gulch, and Cedar Flat Satellite facilities	Fall	Snake and Clearwater Rivers (Idaho)
	Oxbow Hatchery	Fall	Snake River (Oregon, Idaho)
Snake River spring/summer-run chinook ESU	Tucannon River Hatchery (conventional)	Spring	Tucannon River (Idaho)
	Tucannon River Captive Broodstock Program.	Spring	Tucannon River (Idaho)
	Lostine River (captive/conventional)	Summer	Grande Ronde (Oregon)
	Catherine Creek (captive/conventional)	Summer	Grande Ronde (Oregon)
	Lookingglass Hatchery (reintroduction)	Summer	Grande Ronde (Oregon)
	Upper Grande Ronde (captive/conventional)	Summer	Grande Ronde (Oregon)
	Imnaha River	Spring/Summer	Imnaha River (Oregon)
	Big Sheep Creek	Spring/Summer	Imnaha River (Oregon)
	McCall Hatchery	Spring	South Fork Salmon River (Idaho)
	Johnson Creek Artificial Propagation Enhancement	Spring	East Fork South Fork Salmon River (Idaho)
	Lemhi River Captive Rearing Experiment	Spring	Lemhi River (Idaho)
Snake River spring/summer-run chinook ESU (continued)	Pahsimeroi Hatchery	Summer	Salmon River (Idaho)
	East Fork Captive Rearing Experiment	Spring	East Fork Salmon River (Idaho)
	West Fork Yankee Fork Captive Rearing Experiment	Spring	Salmon River (Idaho)

Evolutionarily Significant Unit (ESU)	Artificial Propagation Program	Run	Location (State)
	Sawtooth Hatchery	Spring	Upper Mainstem Salmon River (Idaho)
Southern Oregon/Northern California Coast Coho ESU	Cole Rivers Hatchery (ODFW stock #52)	N/A	Rogue River (Oregon)
	Trinity River Hatchery	N/A	Trinity River (California)
	Iron Gate Hatchery	N/A	Klamath River (California)
Oregon Coast Coho ESU	North Umpqua River (ODFW stock #55)	N/A	Umpqua River (Oregon)
	Cow Creek (ODFW stock #18)	N/A	Umpqua River (Oregon)
	Coos Basin (ODFW stock #37)	N/A	Coos Basin (Oregon)
	Coquille River/Bandon Hatchery (ODFW 44)	N/A	Coquille River (Oregon)
	North Fork Nehalem River (ODFW stock #32)	N/A.	Nehalem River (Oregon)
Lower Columbia River Coho ESU	Grays River	Type-S	Grays River (Washington)
	Sea Resources Hatchery	Type-S	Grays River (Washington)
	Peterson Coho Project	Type-S	Grays River (Washington)
	Big Creek Hatchery (ODFW stock # 13)	N/A	Big Creek (Oregon)
	Astoria High School (STEP) Coho Program	N/A	Youngs Bay (Oregon)
	Warrenton High School (STEP) Coho Program	N/A	Youngs Bay (Oregon)
	Elochoman Type-S Coho Program	Type-S	Elochoman River (Washington)
	Elochoman Type-N Coho Program	Type-N	Elochoman River (Washington)
	Cathlamet High School FFA Type-N Coho Program	Type-N	Elochoman River (Washington)
	Cowlitz Type-N Coho Program	Type-N	Upper Cowlitz River (Washington)
	Cowlitz Type-N Coho Program	Type-N	Lower Cowlitz River (Washington)
	Cowlitz Game and Anglers Coho Program	N/A	Lower Cowlitz River (Washington)
	Friends of the Cowlitz Coho Program	N/A	Lower Cowlitz River (Washington)
	North Fork Toutle River Hatchery	Type-S	Cowlitz River (Washington)
	Lewis River Type-N Coho Program	Type-N	North Fork Lewis River (Washington)
	Lewis River Type-S Coho Program	Type-S	North Fork Lewis River (Washington)
Lower Columbia River Coho ESU (continued)	Fish First Wild Coho Program	N/A	North Fork Lewis River (Washington)
	Fish First Type-N Coho Program	Type-N	North Fork Lewis River (Washington)
	Syverson Project Type-N Coho Program	Type-N	Salmon River (Washington)
	Sandy Hatchery (ODFW stock # 11)	Late	Sandy River (Oregon)
	Bonneville/Cascade/Oxbow Complex (ODFW stock # 14)	N/A	Lower Columbia River Gorge (Oregon)

Evolutionarily Significant Unit (ESU)	Artificial Propagation Program	Run	Location (State)
Columbia River Chum ESU	chinook River/Sea Resources Hatchery	Fall	Chinook River (Washington)
	Grays River	Fall	Grays River (Washington)
	Washougal Hatchery/Duncan Creek	Fall	Washougal River (Washington)
Hood Canal summer-run Chum ESU	Quilcene/ Quilcene NFH	Summer	Big Quilcene River (Washington)
	Hamma Hamma Fish Hatchery	Summer	Western Hood Canal (Washington)
	Lilliwaup Creek Fish Hatchery	Summer	Southwestern Hood Canal (Washington)
	Union River/Tahuya	Summer	Union River (Washington)
	Big Beef Creek Fish Hatchery	Summer	North Hood Canal (Washington)
	Salmon Creek Fish Hatchery	Summer	Discovery Bay (Washington)
	Chimacum Creek Fish Hatchery	Summer	Port Townsend Bay (Washington)
	Jimmycomelately Creek Fish Hatchery	Summer	Sequim Bay (Washington)
Southern California *O. mykiss* ESU	N/A		
Central California Coast *O. mykiss* ESU	Scott Creek/Monterey Bay Salmon and Trout Project, Kingfisher Flat Hatchery	Winter	Big Creek, Scott Creek (California)
	Don Clausen Fish Hatchery	Winter	Russian River (California)
California Central Valley *O. mykiss* ESU	Coleman NFH	Winter	Battle Creek, Sacramento River (California)
	Feather River Hatchery	Winter	Feather River (California)
Northern California *O. mykiss* ESU	Yager Creek Hatchery	Winter	Yager Creek, Van Duzen River (California)
	North Fork Gualala River Hatchery/Gualala River Steelhead Project	Winter	North Fork Gualala River (California)
Upper Willamette River *O. mykiss* ESU	N/A		
Lower Columbia River *O. mykiss* ESU	Cowlitz Trout Hatchery	Late Winter	Cispus River (Washington)
	Cowlitz Trout Hatchery	Late Winter	Upper Cowlitz River (Washington)
Lower Columbia River *O. mykiss* ESU (continued)	Cowlitz Trout Hatchery	Late Winter	Tilton River (Washington)
	Cowlitz Trout Hatchery	Late Winter	Lower Cowlitz River (Washington)
	Kalama River Wild	Winter	Kalama River (Washington)
		Summer	Kalama River (Washington)
	Clackamas Hatchery (ODFW stock # 122)	Late Winter	Clackamas River (Oregon)
	Sandy Hatchery (ODFS stock # 11)	Late Winter	Sandy River (Oregon)
	Hood River (ODFW stock # 50)	Winter	Hood River (Oregon)

Evolutionarily Significant Unit (ESU)	Artificial Propagation Program	Run	Location (State)
		Summer	Hood River (Oregon)
Middle Columbia River *O. mykiss* ESU	Touchet River Endemic	Summer	Touchet River (Washington)
	Yakima River Kelt Reconditioning Program	Summer	Satus Creek (Washington)
		Summer	Toppenish Creek (Washington)
		Summer	Naches River (Washington)
		Summer	Upper Yakima River (Washington)
	Umatilla River (ODFW stock # 91)	Summer	Umatilla River (Oregon)
	Deschutes River (ODFW stock # 66)	Summer	Deschutes River (Oregon)
Upper Columbia River *O. mykiss* ESU	Wenatchee River Steelhead	Summer	Wenatchee River (Washington)
	Wells Hatchery Steelhead	Summer	Methow River (Washington)
		Summer	Okanogan River (Washington)
	Winthrop NFH Steelhead (Wells Steelhead)	Summer	Methow River (Washington)
	Omak Creek Steelhead	Summer	Okanogan River (Washington)
	Ringold Hatchery (Wells Steelhead)	Summer	Middle Columbia River (Washington)
Snake River Basin *O. mykiss* ESU	Tucannon River	Summer	Tucannon River (Washington)
	Dworshak NFH	Summer	South Fork Clearwater River (Idaho)
	Lolo Creek	Summer	Salmon River (Idaho)
	North Fork Clearwater	Summer	North Fork Clearwater River (Idaho)
	East Fork Salmon River	Summer	East Fork Salmon River (Idaho)
Snake River Basin *O. mykiss* ESU (continued)	Little Sheep Creek/Imnaha River Hatchery (ODFW stock # 29)	Summer	Imnaha River (Oregon)

N/A – Not applicable Type-S – Coho that migrate south and spawn earlie FFA – Future Farmers of America

NFH – National Fish Hatchery Type-N – Coho that migrate north and spawn later

ODFW – Oregon Department of Fish and Wildlife STEP – Salmon and Trout Enhancement Program

APPENDIX C

DESCRIPTION OF THE PROPOSED CLARIFYING CHANGES TO THE 4(D) PROTECTIVE REGULATIONS FOR THREATENED SALMONIDS

(1) NMFS proposes to apply the same set of limits to all threatened ESUs by bringing the Snake River fall-run chinook, Snake River spring/summer-run chinook, Southern Oregon/Northern California Coast coho, Central Valley spring-run chinook, California Coastal chinook, and Northern California O. mykiss ESUs under the 14 limits promulgated in 2000, as amended

NMFS believes that the clarity and consistency of the existing 4(d) regulations would be improved by including all threatened salmonid ESUs under the same set of limits, rather than maintaining separate and partially redundant sets of limits for various ESUs. As noted in subsection 2.3, Description of Limits, the limits added in 2002 are redundant to limits promulgated in 2000. Removing the nine limits promulgated in 2002 (67 FR 1116, January 9, 2002; limits §223.203 (b)(14) through (b)(22)) and aligning them under the limits promulgated in 2000 would consolidate and clarify the existing 4(d) regulations, reducing their regulatory and administrative impact, while remaining equally protective of the affected ESUs: the Central Valley spring-run chinook, California Coastal chinook, and Northern California *O. mykiss* ESUs.

NMFS also proposes to apply the limits promulgated in 2000 to the Snake River fall-run and Spring/summer-run chinook ESUs. Presently, these ESUs are afforded the section 9(a) take prohibitions and the limit exempting activities with ESA section 10 incidental take authorization (§223.203(b)(1)). However, the remaining 13 limits promulgated in 2000 do not apply (§223.203 (b)(2) through (b)(13), and (§223.209). At the time of the 2000 rulemaking, NMFS stated that the 4(d) protective regulations for the two Snake River chinook ESUs provided the necessary flexibility to support research, monitoring, and conservation activities. The take limits provided by the 2000 rulemaking have proved useful in managing other threatened ESUs, including the Snake River Basin *O. mykiss* ESU, which has an overlapping geographic range with the two Snake River chinook ESUs. NMFS proposes to include these two ESUs under limits §223.203(b)(3) through (b)(13), and §223.209 to provide consistency with other threatened ESUs and to encourage programs and activities that support their conservation and recovery.

NMFS proposes removing the six limits of the 1997 interim rule for the Southern Oregon/Northern California Coast Coho ESU (62 FR 38479, July 18, 1997; §223.204) and bringing the ESU under the limits promulgated in 2000 (65 FR 42422, July 10, 2000; limits §223.203 (b)(1) through (b)(13)). The limits provided in the 1997 interim rule were the first 4(d) regulations NMFS promulgated for a threatened salmonid ESU. The limits promulgated in 2000 addressed the same types of activities addressed in the 1997 interim rule, as well as many more activities determined to be consistent with the conservation of threatened salmonid ESUs.

Including the Southern Oregon/Northern California Coast Coho ESU under the 2000 4(d) limits would result in two substantive changes in the take prohibitions afforded. The first change concerns the use of electrofishing in research and monitoring activities. In lieu of agency technical guidance on how to minimize the adverse effects of electrofishing on salmonids, the 1997 interim rule specifically prohibits the use of electrofishing (62 FR 38479, July 18, 1997; §223.204(a)(5)). In 2000, NMFS' released its *Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act* (Electrofishing Guidelines; NMFS 2000a; available online at http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf), based on NMFS' research expertise, as well as input from fishery researchers and specialists in electrofishing technology. NMFS believes that exempting the use of electrofishing from take for research and monitoring activities for the Southern Oregon/Northern California Coast Coho ESU, consistent with the Electrofishing Guidelines, would adequately protect fish in the ESU. Additionally, this action would provide consistency by permitting similar activities for the Southern Oregon/Northern California Coast Coho ESU as those permitted for other ESUs within the same geographical range that are covered under the limits promulgated in 2000.

The second substantive change in the protective regulations for the Southern Oregon/Northern California Coast Coho ESU concerns certain scientific research activities. Under the 1997 interim 4(d) rule for this ESU (§223.204(a)(4)), take of listed species associated with certain fisheries research and monitoring activities conducted by ODFW and California Department of Fish and Game (CDFG) personnel may be allowed, pending NMFS' review and approval (62 FR 38479, July 18, 1997). This allowance does not extend beyond ODFW and CDFG, such that take for all other research (e.g., research conducted by academic researchers, contractors, and consultants) can only be afforded under section 10(a)(1). However, the limits promulgated in 2000 (specifically §223.203 (b)(7)) allow for any party conducting research under a state permit to apply for incidental and direct take under 4(d). NMFS has determined that the impact on listed species is the same whether take is afforded under section 4(d) or section 10. Requiring parties to seek coverage under section 10 increases the regulatory and administrative burden without providing additional protections or safeguards for listed fish. Accordingly, this proposed change would streamline the permitting processes for research activities, while remaining equally protective of the Southern Oregon/Northern California Coasts Coho ESU.

Certain 4(d) limits are regional in scope and are not necessarily applicable to those ESUs outside the area of coverage (for example, Limit 11 only applies in the City limits of Portland, Oregon, so it would not affect Snake River steelhead (Appendix A)). These limits are for activities in compliance with joint Tribal/state plans developed within *United States* v. *Washington* or *United States* v. *Oregon* (§223.203(b)(6)); certain park pest management activities in Portland,

Oregon (§223.203(b)(11); and forest management activities on state and private lands within the State of Washington (§223.203(b)(13)). However, NMFS would work with parties interested in pursuing such activities outside the area of coverage for these limits to ensure that any actions would be conducted consistent with the conservation of listed ESUs.

(2) NMFS proposes to amend an expired limit (§223.203(b)(2))

Limit §223.203(b)(2) exempts scientific or enhancement activities with pending applications at the time of 2000 rulemaking (65 FR 42422, July 10, 2000; 67 FR 1116, January 9, 2002). The deadline associated with this exemption has expired. The proposed removal of this expired limit would improve the clarity of the 4(d) regulations, while not impacting the protective regulations for threatened ESUs in any way.

(3) NMFS proposes to move the description of the limit for Tribal Resource Management Plans (§223.209) so that the text would appear next to the 4(d) rule in the Code of Federal Regulations, thereby improving the clarity and accessibility of the 4(d) regulations

The description of the limit exempting certain Tribal Resource Management Plans (§223.209) is separated by several sections in the Code of Federal Regulations from the descriptions of other limits (§223.203). Although this does not diminish the meaning or effectiveness of the limit in exempting certain activities under Tribal plans, its appearance in the Code of Federal Regulations as a disjunct section does not clearly convey the opportunities associated with these plans to Tribal governments. NMFS proposes to move the description of the limit for Tribal plans so that the text appears next to the other 13 4(d) limits in the Code of Federal Regulations. This reorganization would improve the clarity of the 4(d) regulations, but would not modify the limit for Tribal plans in any way.

Table C-1. No Action Alternative. Summary table illustrating the coverage of existing 4(d) protective regulations for 23 Evolutionarily Significant Units (ESUs) of salmon and *Oncorhynchus mykiss* under the No Action alternative.

Pacific Salmon & *O. mykiss* 4(d) Protective Regulations			"No Action" Alternative: listing actions (non-discretionary) with no ammendments to existing 4(d) protective regulations																										
No Action Alternative			223.203(a)	223.203(b) 4(d) Limits (1)-(13) [65 FR 42422,07/10/2000]													223.203(b) 4(d) Limits (14)-(22) [Jan. 9, 2002]									SONCC 223.204; [62 FR 38479, 07/18/1997]						Tribal Plans 223.209 [65 FR 42485, 07/10/2000]
	Salmonid Species	Proposed Listing Determinations	Sec. 9(a)(1) take prohibitions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	S1	S2	S3	S4	S5	S6	Tribal Plans
1	Sockeye Salmon (*Oncorhynchus nerka*)	Ozette Lake Sockeye	X	X	X	X	X	X	X	X	X	X	X	X	X	X															X
2	Chinook Salmon (*O. tshawytscha*)	Sacramento River Winter-run Chinook	No Take Prohibitions																											
3		Central Valley Spring-run Chinook	X	X													X	X	X	X	X	X	X	X	X						X
4		California Coastal Chinook	X	X													X	X	X	X	X	X	X	X	X						X
5		Upper Willamette River Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X																X
6		Lower Columbia River Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X															X
7		Puget Sound Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X															X
8		Snake River Fall-run Chinook	X	X																											X
9		Snake River Spring/Summer-run Chinook	X	X																											X
10	Coho Salmon (*O. kisutch*)	Oregon Coast Coho	X	X	X	X	X	X	X	X	X	X	X	X	X																X
11		Southern Oregon/Northern California Coho	X	X		X																				X	X	X	X	X	X	X
12		Lower Columbia River Coho	No Take Prohibitions																											
13	Chum Salmon (*O. keta*)	Columbia River Chum	X	X	X	X	X	X	X	X	X	X	X	X	X	X															X
14		Hood Canal Summer-run Chum	X	X	X	X	X	X	X	X	X	X	X	X	X	X															X
15	*O. mykiss* (co-occurring resident and	South-Central California Coast O. mykiss	X	X	X	X	X	X		X	X	X	X	X	X																X
16	anadromous forms)	Central California Coast O. mykiss	X	X	X	X	X	X		X	X	X	X	X	X																X
17		California Central Valley O. mykiss	X	X	X	X	X	X		X	X	X	X	X	X																X
18		Northern California O. mykiss	X	X													X	X	X	X	X	X	X	X	X						X
19		Upper Willamette River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X																X
20		Lower Columbia River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X																X
21		Upper Columbia River O. mykiss	No Take Prohibitions																											
22		Snake River Basin O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X																X
23		Middle Columbia River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X																X

Table C-2. Proposed Action Alternative. Summary table illustrating the coverage of 4(d) protective regulations, as proposed for amendment, for 23 Evolutionarily Significant Units (ESUs) of salmon and *Oncorhynchus mykiss* under the Proposed Action alternative.

Pacific Salmon & *O. mykiss* 4(d) Protective Regulations			Streamlining & Clarifying Alternative for Amending 4(d) Regulations [*including adipose-only amendment to 223.203(a)*]													
Proposed Action Alternative			Amended 223.203(a)	223.203(b) Amended 4(d) Limits (1)-(13) [65 FR 42422,07/10/2000] to apply to all threatened ESUs												
	Salmonid Species	Proposed Listing Determinations	Sec. 9(a)(1) take prohibitions *	1	2	3	4	5	6	7	8	9	10	11	12	13	Tribal Plans (223.204)
1	Sockeye Salmon (*Oncorhynchus nerka*)	Ozette Lake Sockeye	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	Chinook Salmon (*O. tshawytscha*)	Sacramento River Winter-run Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3		Central Valley Spring-run Chinook	X	X	X				X					X		X	X
4		California Coastal Chinook	X	X	X				X					X		X	X
5		Upper Willamette River Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6		Lower Columbia River Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7		Puget Sound Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8		Snake River Fall-run Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9		Snake River Spring/Summer-run Chinook	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	Coho Salmon (*O. kisutch*)	Oregon Coast Coho	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11		Southern Oregon/Northern California Coho	X	X	X	X			X			X	X	X	X	X	X
12		Lower Columbia River Coho	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	Chum Salmon (*O. keta*)	Columbia River Chum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14		Hood Canal Summer-run Chum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	*O. mykiss* (co-occurring resident and	South-Central California Coast O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	anadromous forms)	Central California Coast O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17		California Central Valley O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18		Northern California O. mykiss	X	X	X				X					X		X	X
19		Upper Willamette River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20		Lower Columbia River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21		Upper Columbia River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22		Snake River Basin O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23		Middle Columbia River O. mykiss	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* 4(d) protective regulations amended such that the Section 9(a) take prohibitions apply to anadromous fish with an intact adipose fin only.

Color Key

Limit remains unchanged

New limit is afforded to ESU

Former Limit(s) brought under Limits 1-13